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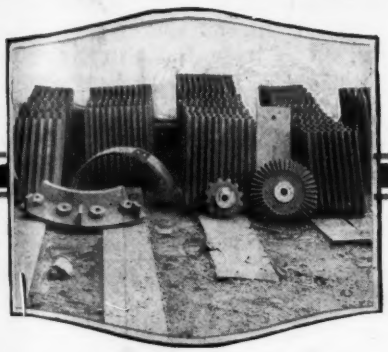

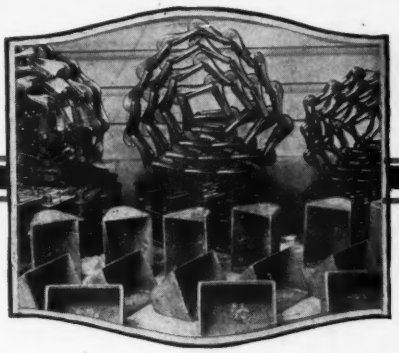

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January, 1924

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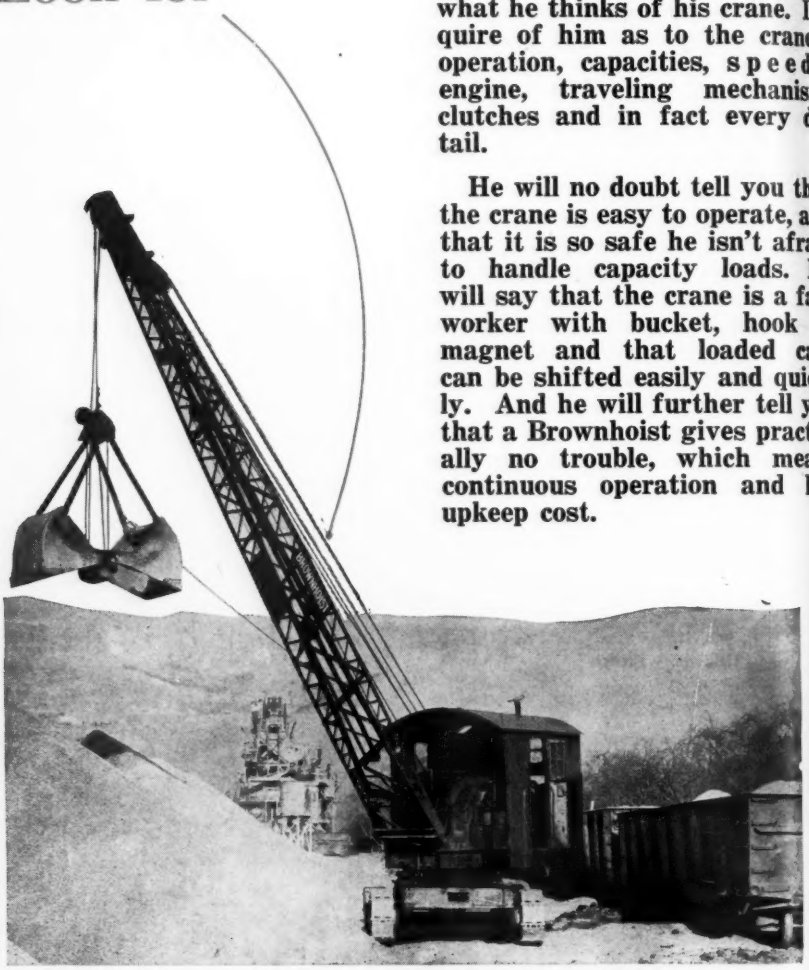

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Pit and Quarry

Member Audit Bureau of Circulations
A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 8 CHICAGO, ILL., JANUARY, 1924 NO. 4

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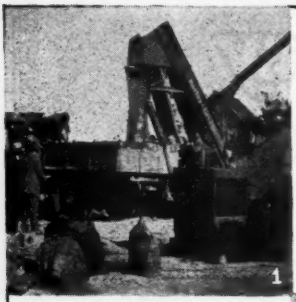

No 2—This Barber-Greene Loader keeps 10 trucks on the move for 9 hours a day. When not used for loading, it is put to stripping surface soil.

No. 1—Loading trucks from storage piles at the Grant Park Gravel Company, Hewlett, L. I. Operated by one man, this Barber-Greene fills a 4-yard truck in 85 seconds.

No. 3—This Barber-Greene replaced a 10-ton crane for truck-loading in the yards of the Lake Shore Stone Company, Milwaukee.

Keeping ten trucks in constant action

Keeping ten trucks running steadily for 9 hours, without stoppage or waiting, is the daily job of a single Barber-Greene Loader, operated by one man at the Grant Park Gravel Company, Hewlett, L. I.

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The Lake Shore Stone Company of Milwaukee were using a 10 ton crane for unloading cars and loading trucks. Demands for even faster production caused them to add a Barber-Greene Loader.

In the loading of trucks it was quickly found that the Barber-Greene saved from 20 to 40 per cent of the time required by the crane. As a result, the crane was released and placed at unloading, the entire loading job being handled by the Barber-Greene.

The economy of time thus effected enabled the Lake Shore Stone Company to key up their production to meet the rising demands, to save all demurrage, and keep labor cost at a minimum.

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BARBER GREENE

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Pit and Quarry

Vol. 8 Chicago, Ill., January, 1924 No. 4

Taking Stock

AT THE END of December most business men balance their books and attempt to figure out their profits for the year that is ending. To do this, an inventory is generally made. The new year is also considered a season for making new resolutions. All this is to be recommended as every business man should at some time or other during the year learn just how he stands.

Every one should stop and take stock, not only of his business assets, but also of his own ability and experience. Even if money has been made during the past, which to the ordinary business man spells success, that should not be sufficient to the ambitious man, for the question is not has money been made, but has all the money that was possible to make, been made. For if a man has failed to make a thousand dollars that it was possible for him to make, then he has not been as successful as he should have been.

Thus, though the taking of stock of all business assets at the beginning of the year is important, yet it is more important for each business man to take stock of himself, and in doing this he should not only analyze his own experiences and mistakes, but he should be broad enough to ask his associates as to his ability and defects, and to court from them frank criticism. Most men resent adverse criticism if made of themselves. This spirit will never put a man ahead. The fact is, that he will go on repeating the same mistakes, continuing to lose money that he would have otherwise made, until he comes to a realization that he must change.

The broad-minded man will want to take stock of himself; to analyze his business of the past as well as the things that he and his associates have done, with the view not only of cutting out in the future the mistakes of the past, but to learn new and better ways of doing business.

One way of doing this is to employ an expert accountant who will go over the books and not only analyze the cost of production but likewise the methods of buying and selling used, and the making of other business transactions. Such an expert can bring many facts to light that have been forgotten. He will ask questions as to why certain things were done and why certain things were not done, and if the operator will be frank in telling of various business transactions and ask for honest criticism he will obtain much information from such an expert regarding his books, and also his business and the things that he has done himself. Based upon the work of such an expert, broader and better plans can be laid for the future and many wrong methods used in the past can be discarded.

A few years ago the writer knew of a stone quarry that was opened up. The man thought he had a good proposition and convinced the capitalists who backed him that he did to the extent that they were willing to furnish him with enough money to develop the quarry.

After a year, to the disappointment of both the operator and his backers, there were no profits to divide, but, in fact, there was a deficit. The man's backers decided to pay for an audit at once and an expert accountant was called. The result of his work was to plan a reorganization and many suggestions were made to the operator and his backers. These were accepted and the operator began a new year with an increased confidence in his own ability. By following the suggestions made and eliminating the mistakes of the previous year he himself became more alert, witn the result that the earnings made by him during the second year were sufficient to pay a handsome dividend over the entire period of two years on the capital invested.

Thus at the end of two years this operator, who had started without money himself, had earned a living and had secured a sizable block of stock of the quarry company that was paying handsome dividends, and his backers were well pleased with their investment. From that time on a semi-annual audit has been made of this business, which has grown steadily, and today it is one of the leading quarries in that section of the country.

This development would have been a failure but for the fact that the operator's backers had the initial audit made, and due to the fact that the operator himself was broad enough to allow the accountant not only to take stock of the quarry company's assets, but also of his own capability and was guided by the suggestions made by his business associates. This man surely succeeded by taking stock of himself.

Besides accountants, there are also other business experts that can be employed to help take stock, and these men can bring to an operator the experience and results obtained by analyzing many other businesses. What will be new to the operator will be old experience to them and they will be able to point out many things that are being done that seemingly should lead to success, when, in reality, they only lead to failure.

Wisconsin Mineral Aggregate Meeting

The fifth annual meeting of the Wisconsin Mineral Aggregate Association was held at the Pfister Hotel, Milwaukee, on December 20. Aside from routine business and the election of officers for the new year, nothing of outstanding interest was done. All of the old officers and directors were re-elected.

In his report for the year Secretary N. K. Wilson stated that predictions made a year ago that the 1923 highway program would exceed any preceding year's figures were fulfilled, as there was a total of 435 miles of concrete highway let, and approximately 1,000,000 square yards of city streets.

The outlook for 1924, however, is questionable, said Mr. Wilson, at times the highway program appearing favorable—anywhere from 200 to 300 miles. The present method of doing business by individual bond issue is inadequate. The only remedy would appear to be a state-wide bond issue such as Illinois enjoys.

A reduction in membership fees was discussed and favored during the meeting, and this matter will probably be taken up further by the board of directors at its next meeting.

The usual banquet was held in the evening, followed by a varied and excellent dancing and singing entertainment. E. E. Gillen of the executive board, acted as toastmaster. Speeches were made by J. K. Jensen, president, and E. G. Brown, both of the Janesville Sand and Gravel Company, Janesville, also by John J. Sloan, president of the Chicago Board of Local Improvements, and A. R. Hirst, State Highway Engineer of Wisconsin.

Officers re-elected are: J. K. Jensen, president; J. D. Ohrt, vice-president; I. M. Clicquennoi, secretary-treasurer. Executive board: J. K. Jensen, J. D. Ohrt, I. M. Clicquennoi, A. J. Blair, E. E. Gillen, R. C. Brown, Sr., Louis Laun.

Facing the Problem of Cost

By Daniel J. Hauer.

IT can be said that a producer of any product is always facing the problem of cost, and more especially cost reduction. However, at the beginning of a new year this problem has special significance, for with the close of the year when books and accounts are balanced and old records of cost are analyzed much information is gleaned of what has been done in the past and the new year presents many opportunities for reducing cost, under the guidance of past experience and results.

It is not always possible to reduce costs, but the progressive man should always be putting forth his best endeavors to obtain *some* reduction. This can only be done by dividing the keeping of production costs into a number of units. This gives greater detail, and the total cost can then be reduced by saving on some items, although it may not be possible to save on others. For instance, in producing crushed rock, it is possible to divide cost into at least eight items as follows:

(1) Stripping; (2) blasting; (3) secondary breaking up; (4) loading; (5) transporting; (6) crushing and screening; (7) conveying and storing; (8) loading for shipment.

Men of experience will realize that some of these items can be broken up into several details. For instance, the stripping can be divided into the excavating of overburden and the hauling of it away, unless it is done by some method where the two operations are in one, as in hydraulic stripping, or in using a slack line cableway. For blasting there are two distinct operations, namely, the drilling of the holes and the cost of labor and explosives for blasting. So it is with a number of other items, and if one is to be successful in the problem of reducing costs, his records must be kept in elaborate detail.

It may cost twenty-five cents a ton for blasting rock in making the primary blast, but the total cost, including the secondary cost of breaking up, may be fifty cents. By keeping these two items separately it can be seen at once that the secondary blasting is entirely too expensive. There may be no way of reducing this cost by improving the methods of secondary blasting, but this cost may be reduced considerably by changing the methods of primary blasting. First, the spacing of the hole might be so changed as to allow the blast to be more effective and the charges of explosive may be so placed in the hole so as to give more effective rending of the rock. Thus by such changes the secondary blasting may be reduced considerably. As the rock would not be broken so large, requiring less secondary blasting, the cost of this item would be lower.

To revert to the primary blasting: if this item is kept in detail, there are a number of wastes that can be cut out. For instance, the drilling cost should be kept separate from the actual cost of blasting. In keeping such cost it is well to segregate the work of moving, setting up and preparing to drill, from that of the actual drilling. Only in this way the lost time of preparation can be known and cut down. Such a record may show that the stripping of the ledge is not done as well as it should be, and economies can be effected. It would also be possible to make a study of moving and setting up drills so as to eliminate wasted time, which would further reduce the cost. Based upon all records, charts should be made of holes drilled, so as to show the spacing and depth, as this is an

important factor both in the cost of drilling and blasting and the effectiveness of the explosive. It is a very simple problem to make such charts, and even poorly educated drill runners can learn to chart holes.

If holes are spaced too closely, the cost of the primary blasting will be excessive, while if they are spaced too far apart, not only can the cost of the primary blasting be increased, but that of the secondary blasting will be excessive, as already pointed out. Exact and proper spacing is important. Where a ledge breaks evenly it is a simple matter to space holes for effective work, but where the ledge breaks in an irregular fashion it is more difficult to decide on the spacing of holes, and in order to reduce cost this matter must be given close attention.

The same principles apply to the record kept of the cost of labor and explosives. The cost of labor in making a blast as compared to that of the cost of explosives used is small, nevertheless, it is possible to have a decided waste and for that reason it is well to know from the records the number of men employed in getting ready for the blast and handling the explosive. A few extra men that may not be needed can quickly add a cent or more per ton to the cost of the blasting. In order to get the best results from the explosive and to keep down the cost of blasting, it is well to have some record kept of the method of loading the holes and the amount of explosive used in each. These records can be kept by means of a rough chart, and when dynamite is used the number of cases or sticks will show the amount of explosive placed in each charge. From such records, it is possible to experiment and rearrange the loading or charging so as to get more efficient results and so reduce the cost.

In some cases there is little trouble in keeping costs of loading, for this may be done on a contract basis between the employer and employes. There may be an agreed upon price per ton or carload or skipload. If this is the case, the cost or price cannot be reduced, as to do so means to lose the confidence of the men. This form of contract paying is known as "piece work," and before a rate is fixed the matter should be studied carefully so as to set an equitable price that will stand for years. Men will not object to having the price raised, but dissatisfaction will be engendered if the price is cut.

If the loading is not done by contract, then there should be a continual endeavor to reduce the cost. Where hand loading is done it is not only possible to study the work so as to reduce the cost by this method, but it is also possible to substitute other methods of loading that may materially reduce the cost. This has reference to such methods as steam shovel loading. If material is to be segregated or sorted as it is loaded, then it may not be practical to use a steam shovel, but in other cases, in the writer's opinion, it is possible to use a steam shovel in loading.

During the past year a number of articles have appeared in PIT AND QUARRY on the subject of hand loading versus steam shovel loading, and in the December issue of this journal there was an article written by a representative of one of the steam shovel manufacturing companies, giving a number of examples to show how costs were reduced by substituting steam shovel loading for hand loading in quarries. The statement was made that the records gathered by that company show that loading in quarries, cost with steam shovels, from 25 to 65 per cent lower than the costs were when loading by hand. And, further, the average saving in loading cost in the different quarries considered, ran over 50 per cent. The writer believes that these figures can

be used for guidance and are accurate enough to indicate the merits of the two methods of loading. Surely when costs can be cut in half it behooves any operator who is not using steam shovels to consider purchasing one, for the extra profits thus made by a steam shovel will quickly effect enough saving to pay for itself.

Another decided advantage of the steam shovel is that it helps to solve an operator's labor problem. The largest number of men used around a quarry are those employed in rock loading, and a shovel with 10 to 20 men employed at the ledge should easily replace a crew of 35 to 50 men. This means the employing of fewer men, and in many cases when this happens it is possible to employ a better grade of men. Furthermore, with a steam shovel the output of a quarry is more regular and this means a reduction in the costs of transporting and crushing.

Some operators have tried to use a steam shovel in their quarries and have discontinued it. In the writer's opinion, this is due to the lack of knowledge on the part of an operator to the proper methods of blasting and shovel operation. During the past year the writer learned of one quarry that had stopped using a shovel, owing to the fact that their ledge was very high and they found that rock frequently fell on the shovels from the ledge and put it out of commission. This could have been prevented by working the ledge in two lifts, which always proves more economical than by working an excessively high ledge.

Another method of preventing the trouble that occurred in this quarry is to have the blasting well ahead of the shovel and before starting the shovel to work to shoot down the top of the ledge ten or twenty feet back from the face.

Another advantage gained by this method of blasting is to make the next row of deep holes more effective, as the burden on the blast will not be so great, nor will there be so many large boulders to break up in front of the shovel. If fifty per cent of the loading cost can be saved, it will certainly pay to spend a little more money in blasting.

Even if steam shovels are used for loading, the operator is continually facing the problem of reducing the loading cost. There is not the same opportunity of reducing these costs as in hand loading, but nevertheless, it is possible to effect economies in steam shovel loading. For instance, a three-quarter yard shovel may load at the rate of 40 tons an hour for several days, while the following week this shovel may load about 60 tons an hour. The problem for the operator is then to continue the 60-ton work, which would mean with the same crew to reduce the loading cost 50 per cent, over the days when it only loaded 40 tons.

The problem of the cost of transporting rock from the ledge to the crusher is not easily solved. It is true that certain waste, with a given equipment might be discovered and cut out, but generally speaking, to reduce the cost of transportation by any considerable amount, means the expending of money for new equipment. If the tonnage handled in a day is large, dinkies will effect a saving over horses. If cars are being used, then costs may be reduced by obtaining a better type or a larger size car. This is especially the case if a steam shovel has taken the place of hand loading. As a rule to continue the use of cars any length of time that were employed when hand-loading methods were used, for steam shovel loading is a mistake, yet this is frequently done. There is at present a series of articles being published in this journal descriptive of quarry cars, and suggestions are given as to the size and type of cars to be used in various quarries. The reader,

who may be interested in selecting a new car, is referred to these articles.

Besides purchasing dinkies and motors and new cars in order to reduce the cost of transportation, consideration can be given, when steam shovels are used to installing motor trucks. During the past five years these trucks have been tried out in a number of quarries and have proven successful so that more attention is being given to transporting rock from the ledge to the crusher by this method. One thing in their favor is that these same trucks, if for any reason they are not needed for use in the quarry, can be used for delivering stone to customers, and they can always be used after the day's work is finished in the quarry, for night delivery of the product.

The fact is that motor trucks are revolutionizing the delivery of crushed stone, sand and gravel in the large cities, and even for long distance deliveries in the country. It has been found that deliveries can be made with trucks during the night just as well as during the day. This means that a given tonnage can be delivered with half the number of vehicles,—a considerable saving in investment. This makes possible the use of a few trucks for day deliveries, and the use of other trucks for work in the quarries and at night add these trucks to the fleet delivering products.

The problem of crushing is in some ways easy and in a fair sized plant, is a small percent of the total cost, yet it is possible in some cases not only to reduce costs of crushing, but to materially increase the output of the crusher, which counts much in the total operations. In other words, studies can be made of feeding the crusher so as to increase the amount of stone crushed each day, and this would mean to reduce the cost. The idea in operating is to use a minimum number of men in serving and attending to the crusher, but it can readily be seen that in attempting to save money too few men can be used around a crusher so that the production is reduced.

For example, if an extra man can increase the tonnage crushed by 50 to 100 a day, it is economy to employ such a man, as his wages would be small compared to the extra income derived from his work.

Crushers are seldom run to full capacity, and in some cases it is never possible to get from the crushers their rated capacity. However, it is nearly always found practical to increase the amount of stone that is being crushed. Some years ago the writer was called in consultation to increase production in a large New England quarry, and without increasing the forces or buying any new equipment it was found possible to so improve the methods of doing the work that the crushers were able to produce 50 per cent more than the past records of production showed. This did not mean many changes around the crusher itself, but it did mean changes in the various quarry work, introducing new methods and improved practices. What was done at this plant can be done at others.

If all has been done that is possible to obtain the greatest production from a crusher or a set of crushers, then the only way to further increase the production of crushed stone and reduce the cost is to install new crushers, and this may entail the rebuilding of the entire plant, and it likewise means a large capital investment. Of course this can only be considered as a last resort.

It is quite surprising in visiting quarries throughout the country, how many of them are using crushing plants that are too small to be either economical, or to furnish the amount of stone for which sale can be found. This is due to two reasons: the first of which is that when many plants are built, the project being new, the operator can not tell to what extent his

business can be developed. The second is that crushers are rather expensive machines, and with the uncertainty of the future it does not pay to buy what would seem to be excessively large crushers. The result is that as the business is developed the old crushers are continued in use much longer than they should be. The time comes, though, when the business demands the entire rebuilding of the plant, when larger crushers are installed and the operator realizes that he should have made this change years before.

In some few cases it is necessary to change screens so as to reduce costs, or increase production without making changes about the crusher, but in most cases when screens are installed they are of such size as to take care of a larger output than the crusher ever gives. The greatest consideration regarding the screens is to grade the product so that it will bring the largest prices.

The seventh item of cost that is listed is that of conveying and storing the product. This is a large subject and cannot be considered in a few words. There are many systems of conveying and storing the product and nearly every quarry will present a problem of its own. Bucket elevators are generally used to carry the stone from the crusher to the screen, and gravity is frequently used from the screens to the bins. If the plant is run when there is little sale for the product, then consideration must be given for extra storage and this may mean an elaborate system. Articles upon this subject have appeared in this journal during the last few years.

The only consideration that needs to be given the eighth item of expense, namely loading for shipping, is when there is an extraordinary cost, for under usual conditions this cost is very small, as cars and trucks are generally loaded directly from bins. When this is not done then it is necessary to give the subject careful consideration so as to keep the cost at a minimum.

An item of cost that is not listed is that of overhead expense, and this is one that can be much larger than an operator can imagine, unless he keeps accurate records of all his overhead charges.

There are a large number of items that enter into these overhead charges, too many to enumerate in this article. Due to the fact that a large number of items goes to make up overhead too many business men ignore them and it is possible to sustain a loss by so doing. For if they become excessive, they can eat up all profit. Unfortunately for quarrymen they must often sell their products, not at the price they would desire but at such a price as to meet competition. Therefore the margin between actual cost of production and the selling price may be small and without an account of overhead charges. The gross profits may be found to be a little more than the overhead charges, leaving a very small net profit.

It can thus be seen that every quarryman should know his overhead cost and fight hard to keep them down. A much desired condition is to be able to add the overhead charges to the eight items of production cost, and to this total add a percentage of profit, and such profit would then be net. It is the desire of the writer at an early date to present more facts on this phase of overhead charges, that will help operators to face the problem of reducing cost.

This entire problem can only be solved by keeping accurate costs and it is at this time of the year that operators have the leisure to ponder over these matters. If any man is not keeping a cost system he should make arrangement to obtain one at once. Many business organizations are now devising cost-keeping systems for their members, and it is possible for an operator either to use these or to make

such changes in them as may suit his needs. If this does not suit him, he can have a system devised by some expert for his own work. He should under any condition have a good cost-keeping system, for in this way only can he face the problem of reducing cost.

November Cement Production

Production of portland cement in November was 12,600,000 barrels, an increase of 11% over November, 1922, according to the latest bulletin issued by the United States Geological Survey. For the eleven months ending November 30, production was nearly 127,000,000 barrels or 12% more than ever before for a similar period.

A seasonal falling off is shown in shipments for the month, the movement from the mills being 10,251,000 barrels. Shipments for the eleven months' period exceeded 129,000,000 barrels, an increase of more than 17,000,000 over the corresponding period of 1922, the best previous record.

Notwithstanding the remarkable demand experienced this year, production has been relatively greater and stocks of finished cement in manufacturers' hands on November 30 were nearly 7,000,000, an increase of 30% over last year.

Power and Mechanical Engineers Meet

The Second National Exposition of Power and Mechanical Engineering, held in the Grand Central Palace, New York City, December 3 to 8, inclusive, proved a big success. Many responsible engineers and executives were attracted by the variety and excellence of the exhibits. Additional attraction was found in the meetings of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers, held simultaneously in New York.

Three purely educational exhibits were shown, one devoted to fuels, another to the development of the steam locomotive, and a third displaying drawings of latest developments in modern boilers operating at high temperatures and high pressures.

A large number of films, provided by manufacturing companies, were shown twice daily. Many commercial exhibits were also shown and the amount of business placed and inquiries made exceeded the greatest expectations of the exhibitors.

The November issue of The Hercules Mixer contains a review of the year for the industry, an address by G. H. Markell, general manager, several feature articles and numerous interesting pictures of shopmen and local organizations, also personalities and book reviews.

Figures represent barrels, 000 omitted. One barrel equals four sacks.
Total Production: 1922—114,790,000 bbls. 1921—98,842,000 bbls.

PRODUCING DISTRICTS as shown in Statistical Reports of United States Geological Survey		No. of Mills	CEMENT PRODUCTION NOVEMBER 1923	1922	1921	FIRST 11 MONTHS 1923	1922	1921
1	Eastern Pennsylvania, New Jersey and Maryland	22	3,139	3,056	2,135	32,749	28,517	23,575
2	New York	9	677	660	540	6,409	5,353	5,290
3	Ohio, Western Pennsylvania and West Virginia	11	1,262	1,075	712	12,515	10,013	8,320
4	Michigan	14	780	658	523	6,971	5,731	5,443
5	Illinois, Indiana and Kentucky	10	1,809	1,719	1,523	19,676	16,573	15,869
6	Virginia, Tennessee, Alabama and Georgia	10	831	567	495	7,150	5,480	4,771
7	Eastern Missouri, Iowa and Minnesota	10	1,345	1,184	957	12,986	10,384	9,307
8	Western Missouri, Nebraska, Kansas and Oklahoma	11	921	843	722	9,091	7,399	5,836
9	Texas	5	348	311	235	3,948	3,266	2,395
10	Colorado and Utah	5	231	153	151	2,308	1,960	1,780
11	California	9	1,052	842	751	10,288	7,719	6,769
12	Oregon, Washington and Montana	9	208	281	177	2,878	2,804	2,379
	Total	125	12,603	11,349	8,921	126,969	105,199	91,734

Two Big Conventions

During the week beginning January 21, 1924, St. Louis, Mo., will be the Mecca of the sand, gravel and crushed producers of the country. At that time probably more producers in these industries than have ever come together before will meet at their two conventions.

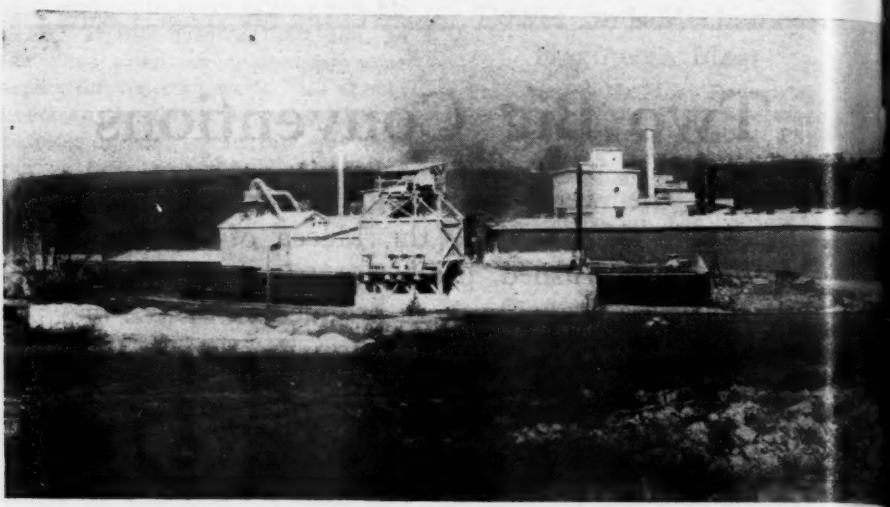
National Crushed Stone Association

Convention will be held at the Statler Hotel, St. Louis, on January 21, 22, 23. A remarkably fine program has been prepared and the event will be of distinct benefit to the industry as a whole and to each man attending.

National Sand and Gravel Association

Convention will be held at the Chase Hotel, St. Louis, on January 22 and 23. Here, too, a carefully prepared program will be presented, and producers who attend will carry away much that will help them.

St. Louis, Mo.



Plant of the Palmer Lime and Cement Company at Y

A New Achievement in Lime Production

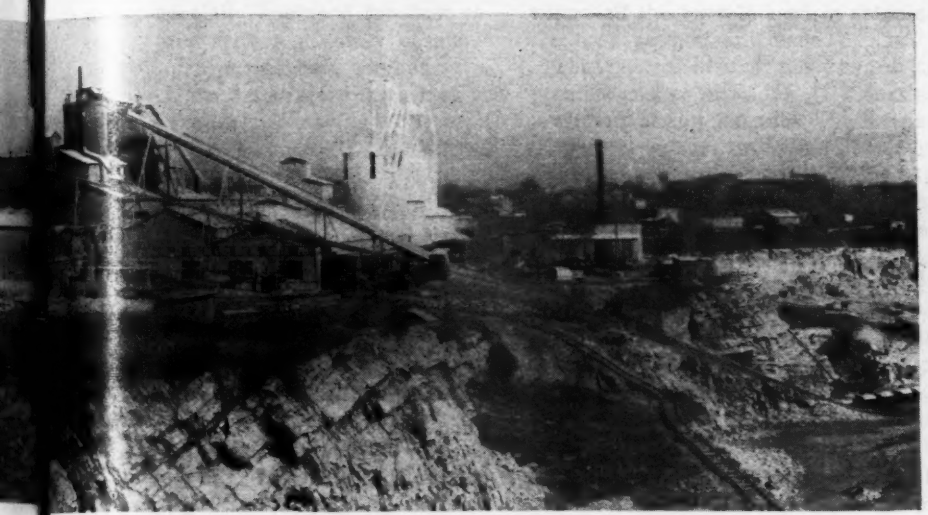
THE York, Pa., plant of the Palmer Lime and Cement Company is a notable one—one of the achievements of the present year in operations of this kind. This company is operating another plant at Oranda, Va., and is known as one always on its toes and ready to consider anything new which bears promise of making better production possible and giving a greater tonnage for the extensive market which the company supplies.

As shown in one of the illustrations, the workings from which the limestone is secured is a pit quarry worked in two benches. The strata of limestone in various parts of the quarry are unevenly disposed as can be seen from an inspection of the foreground of one of the illustrations. Cars of excavated limestone are drawn up an incline by cable from where, after dumping, the material may be routed in one of a number of different ways.

The plant equipment consists of 10 modified coal fired Keystone lime kilns. These kilns have been in operation since 1907 and during the last year were equipped with a special lime drawing equipment manufactured by the Link-Belt Company. In addition there are two very large kilns of special design. They were built in 1912. They were at the time and still are the largest shaft kilns in use.

The Keystone kilns employ a modified Eldred combustion system in connection with two coal furnaces. The main feature of the Eldred system consists in the return to the fire boxes, by means of fans, of the gases that are released from the tops of the kilns. The advantage of the system lies in the tempering effect that these gases have upon the flame from the fire boxes.

The large special kilns are gas fired. There are four R. D. Wood & Company gas producers of 11 foot diameter. Each of these kilns has two producers which are of the hand-



sylvania. Crushing Plant, 10 Small Kilns, 2 Large Kilns, Hydrator Plant

poked type. The lower part of each of the large kilns is divided by a diaphragm.

The gas inlet system, especially designed for these kilns, is quite a complicated arrangement and produces very distinct economies.

The capacity of the battery of the Keystone kilns is 120 to 150 tons of lime per day. This figure must be understood to include only material from which the cores have been removed and which is, consequently, a pure lime. The capacity of the two big kilns ranges from 75 to 100 tons a day, this figure also applying only to pure lime from which the cores have been removed.

The average fuel ratio of the 10 small kilns is 3.9 to 1. The fuel ratio of the two larger kilns is 5.25 to 1.

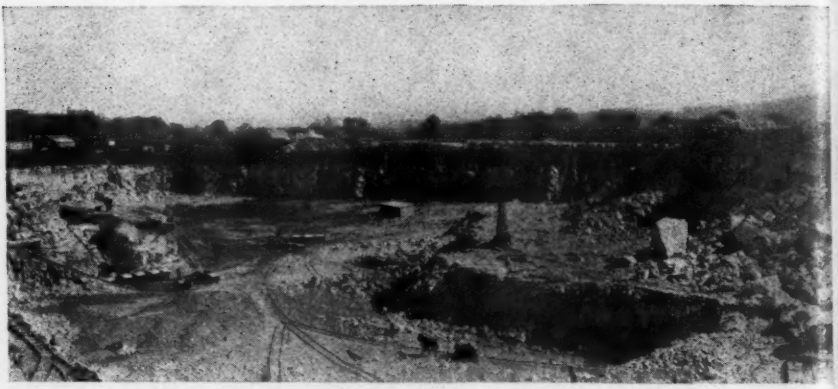
The large kilns may be operated through the entire 12 months of the year on one set of linings. Linings on the battery of 10 smaller kilns last from 6 to 9 months.

Operation of the small kilns requires five firemen, one draw-man and one man for ash removal in each shift. Operation of the larger kilns requires four firemen, one draw-man, one man for ash removal in each shift. Supervision of large and small kilns is under one foreman. It will thus be seen that, from the viewpoint of labor, the operation of the larger kilns is rather more economical.

The company is at the present time planning on the installation of oil burners on the smaller kilns to reduce the labor cost. Experience with this oil equipment will determine whether or not oil burning practice may be adapted for the larger kilns also.

The small kilns discharge through pan conveyors into a 7-ton electric trolley car that runs parallel to the kilns. This car is weighed each time before dumping into the lime bin. The large kilns discharge into small industrial railway cars that are pushed by hand to the dumping hopper. This is located beside the lime cooling bin.

The pan conveyors referred to above constitute the chief feature of the Link-Belt lime-drawing equipment that was added during the last year to the battery of the small kilns. The pan conveyor is a piece of steel equipment



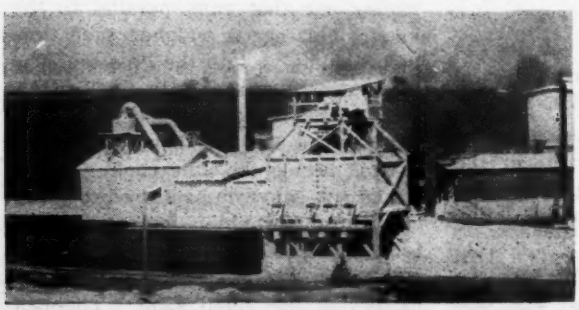
Quarry of the Palmer Lime and Cement Company

18 inches wide running on an incline under the draw shears of each kiln.

At both ends of the conveyor is installed the air intakes that do the work of dust collection. The kiln intake is of 6-inch size and the main intake of 12-inch, all of galvanized pipe. Suction at the intake is provided by a 40-inch Sturtevant fan at one end of the battery. No attempt is made to recover the lime dust secured. It is discharged into the air.

As explained above, the dumping of cars of hot lime is into a steel hopper. This is located in the floor of the lime plant. From the hopper, a 20 by 24-inch bucket elevator is fed through a 5-foot reciprocating feeder. This carries it to a 500-ton steel lime cooling bin where a special distributing conveyor divides the lime into five partitions. Dust at this point is handled by a Sturtevant fan system operated by a 70-inch Sturtevant mill. This dust is sent ahead to mix with the hydrate fed at the lime pulverizer. A 42-inch Williams hammer mill prepares the lime for hydration. The material going to this mill is that which is selected at the point where lump lime is barreled, fines being sent ahead to the hammer mill. From the hammer mill a 12 by 7-inch enclosed bucket elevator carries the crushed lime to a 200-ton ground lime bin. This bucket elevator has a capacity of 56 tons of ground lime per hour.

Ground lime is drawn off from the bottom of the ground lime bin through a screw conveyor especially designed by the Schaffer Engineering and Equipment Company. This conveyor carries it to a 10 by 6-inch bucket elevator at the rate of 35 tons of ground lime per hour. This elevator feeds a Schaffer poidometer through a Schaffer automatic hopper. This poidometer controls the flood of lime and water into a No. 1 special Schaffer hydrator. The hydrator is an improved



A View of the Crushing Plant

model specially equipped for dust recovery and with a capacity of about 20 tons of hydrated lime per hour.

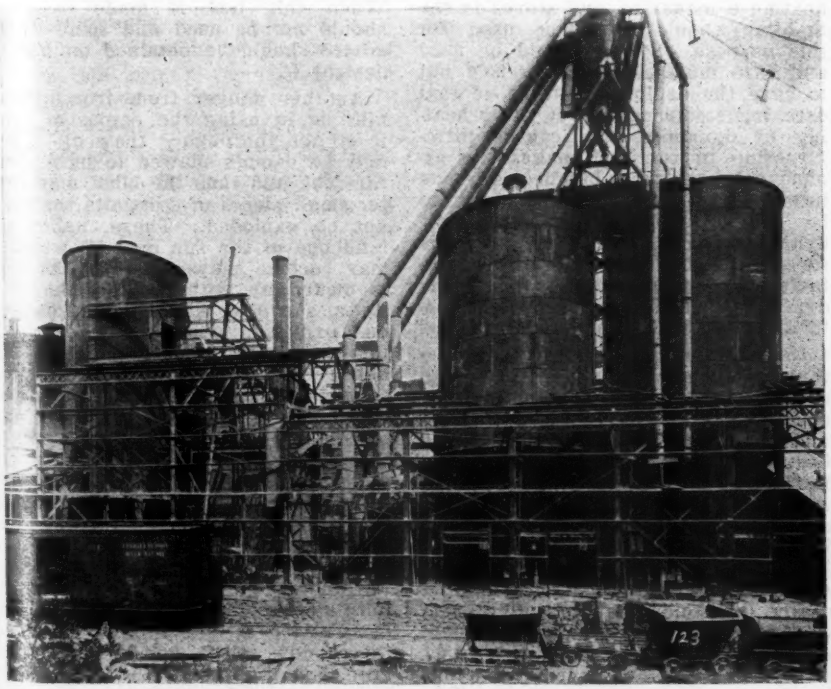
Lime from the hydrate is carried to a battery of two Raymond mills by a screw conveyor. After the lime has been pulverized in the Raymond mills, it is elevated by air to two hydrate storage bins, each with a capacity of 250 tons. A four-way Bates valve bag packer is located below each of the hydrated tanks.

In addition to the production of bulk and hydrated lime, the company also conducts a number of other activities at York. They have a plant for the drying, crushing and pulverizing of limestone and a plant where chemically pure calcium carbide is manufactured by a precipitation process for special purposes.

In connection with the plant there is a cooperage plant operated by the International Cooperage Company, where all the barrels used in shipping the bulk product are made.

The design of the new hydrating plant was by Mr. John C. Schaffer, president of the Schaffer Engineering Company, but at that time president of the Schaffer Engineering & Equipment Company. The McGann Manufacturing Company of York, Pa., through its vice-president and general manager, Mr. Wm. J. Kuntz, handled the work of making the actual installation. All these activities were carried on with the close cooperation of Mr. Lowell M. Palmer, president of the Palmer Lime and Cement Company, and by the Palmer company's general manager, Mr. C. G. King.

The hydrator and poidometer were manufactured and installed by the Schaffer Engineering and Equipment Company of Pittsburgh. The Link-Belt Co., Philadelphia, installed the drawing and conveying machinery.



Important Improvements Were Made During 1923

Frozen Dynamite

Quarry operators who use dynamite during the winter months should exercise unusual care in both handling it and in making blasts. The ordinary brands of dynamite congeal or to use the ordinary term, "freeze" at a temperature of from 40 to 45 degrees Fahrenheit.

When dynamite freezes it is difficult to explode it, therefore, it must first be thawed. Frozen dynamite is safer to handle than dynamite which has never been frozen. It is easy to tell when a stick of dynamite has been frozen, for it becomes stiff and hard and is not easily broken, even when taken out of the wrapper. Well-made and fresh dynamite, if handled properly, is not dangerous, but if it becomes frozen it is less dangerous as long as it remains frozen. It is the thawing process that makes it dangerous, and inasmuch as the explosive must be thawed to be used, it is necessary to warn users against improper methods of thawing.

Dynamite can be stored in heated magazines so as to prevent it from freezing. Care must be exercised in heating a magazine, and stoves in the building should never be used for this purpose. Steam should be used and care must also be exercised not to have the explosives stored so that escaping steam can hit it. Overheating of dynamite also causes nitro-glycerine to run and makes the explosive dangerous to handle. Any one interested in building a magazine to be heated, so as to prevent their dynamite from freezing, can get plans for such a building from the manufacturers from whom they buy their dynamite. Such plans will show how to arrange the heating apparatus.

If dynamite freezes and must be thawed it should never be done around a boiler or a stove or in front of an open fire or in hot water, as all these methods are dangerous to life and some to property. The proper method to use in thawing dynamite is with a thawing kettle. Buy one and use it according to directions. It is the only safe way. No employer has a right to allow his men to use crude methods in thawing dynamite, as the law holds that an employer is to some extent a guardian of his men, and if a workman will not protect himself his employer should see that he does.

As already stated, dynamite is not particularly dangerous and if a magazine full of dynamite should become frozen early in the winter and should remain so until spring there will be little trouble. Unfortunately this is not always the case, as in most sections of the country dynamite stored in unheated magazines will freeze during a cool spell, and thaw out during mild weather.

It is this successive freezing and thawing that makes dynamite dangerous to handle. By the thawing process the nitro-glycerine which is held in suspension by the dope used in making the dynamite, becomes free and leaks out of the stick, changing the color of the wrappers. Globules of it can form in the stick and thus there is free nitro-glycerine, and this is exceedingly dangerous.

When this condition arises the dynamite is said to be "rotten," and it should not be used, but should be destroyed. Fortunately, not much dynamite stored in small lots gets in this condition. Rotten dynamite can be detected by cutting a stick open and exposing it to the air and in a short time it will turn green. When this test is made dynamite should not be used and some expert advice should be obtained on how to destroy it.

Another danger from frozen dynamite is in using the explosive when it is not thoroughly thawed. There may be enough thawed to blow down the rock and thus the blast may scatter small pieces of dynamite that may not be exploded. These, under the influence of the sun or mild weather, may become thawed and as the rock is picked up with metal tools, as a steam shovel or hand tools, a dangerous explosion can occur. Dynamite that is thawed in a regular thawing kettle is not likely to be in this condition, but when other means of thawing it is used, it frequently happens that only part of the stick is thawed so as to make it unfit to use.

These are some of the bugbears of using dynamite that freezes during the winter months, and this word of warning is written for those who persist in using this kind of explosive. Fortunately no one has to use a dynamite during the winter months that freezes, for all the leading manufacturers now sell a non-freezing dynamite, one that will stand exceedingly low temperature without congealing.

Exhibits at Stone Convention

At the meeting of the Manufacturers' Division of the National Crushed Stone Association in New York City November 19, it was agreed that the preferable way of handling the exhibits of the many manufacturers was to provide as many booths as possible, all expressing a willingness to double up and share space with non-competitive manufacturers.

The secretary-treasurer of the Manufacturers' Division has laid out 23 booths or divisions in the Exhibit Hall, and has assigned two or more members to each booth. To date only 23 associate members have signified their intention of engaging booths.

ASSIGNMENT OF BOOTHS

Booth 1—Smith Engineering Works, model crushing plant; Columbus-McKinnon Chain Co., literature.

Booth 2—Robins Conveying Belt Co., models; Bucyrus Co., literature and photographs.

Booth 3—Shope Brick Co., samples of concrete brick; General Electric Co., literature.

Booth 4—Morgan Engineering Co., model; Carroll Chain Co., literature; Hendrick Mfg. Co., literature.

Booth 5—Taylor-Wharton Iron & Steel Co., small castings; Grasseli Powder Co., literature.

Booth 6—Koehring Co., models; New York Belting & Packing Co., literature.

Booth 7—Atlas Powder Co., literature; Chalmers & Williams, models.

Booth 8—Keystone Consolidated Publishing Co., literature; Galion Iron Works, literature.

Booth 9—Sanderson Cyclone Drill Co., model; E. I. du Pont de Nemours Co., samples; Ensign-Bickford Co., samples.

Booth 10—American Manganese Steel Co., small castings; American Hoist & Derrick Co., literature.

Booth 11—Pennsylvania Crusher Co., models; Loomis Machine Works, literature.

Booth 12—C. G. Buchanan Co., possible model; General Explosives Co., literature.

Booth 13—Marion Steam Shovel Co., model; Worthington Pump & Machinery Corp., literature.

Booth 14—Quaker City Rubber Co., literature; Flexible Steel Lacing Co., samples.

Booth 15—George H. Haiss Mfg. Co., literature; Allis-Chalmers Mfg. Co., literature.

Booth 16—Trojan Powder Co., literature; Pit & Quarry, literature.

Booth 17—Earle C. Bacon, Inc., literature; Inland Engineering Co., literature.

Booth 18—Austin Mfg. Co., literature; Buffalo Wire Works, literature.

Booth 19—G. H. Williams Co., literatre; Fate-Root-Heath Co., literature.

Booth 20—Fred A. Gill, samples; Easton Car & Construction Co., literature.

Booth 21—Williams Patent Crusher & Pulverizer Co., models; H. K. Porter Co., literature.

Booth 22—Osgood Co., literature; Hercules Powder Co., samples.

Booth 23—Rock Products, limestone plaster exhibit; Traylor Engineering Co., literature.

Fabrication of Domestic Talc

A study of the methods of beneficiation and fabrication of domestic talcs into electrical insulator shapes is being made by the Department of the Interior, in co-operation with the American Lava Corporation, at the ceramic experiment station of the Bureau of Mines, Columbus, Ohio.

Similar materials are used largely in Europe for this purpose, but due partly to a lack of information in regard to what have been held as secret processes and partly to a lack of properly prepared raw material, the American industry has been backward in its development.

Winter Plant Visiting

IT IS during the winter season when the weather is inclement and work is slack, that pit and quarry operators have the best opportunity of visiting other plants, both near and far, and keeping up with the times. It is true that a great many plants are shut down during the winter months and for this reason it is not possible to see the methods of operation, but it is possible to see the layout of the plant and the kinds of machine and equipment used. A man of experience can see and understand much, even if the plant is idle.

"I am a part of all that I have seen," once wrote a learned man and scholar. The writer knew of one sand and gravel operator on the Pacific coast who spent several months last winter in traveling across the continent. He went east to New York and New England by a northern route and returned home through the south and southwest. He visited large and small operations, and although he saw many things that his own experience had taught him were obsolete, yet he saw very much that was new and that he could use, or ultimately make use of. The two months gave him an education such as he could not have gained from his own experience in a lifetime.

It may not be possible for every one to make such an extensive trip, but such trips as can be made will prove an excellent investment, one that will pay large dividends. This journal would advise every operator to plan one or two journeys of the kind during the next few months, and if he find a plant that he would like to see in operation, he could later in the season make a second trip to study the methods there used.

It is by such visits that a man makes capital from another man's experience and work. Nearly every one will give a visiting operator a hearty welcome and will gladly explain how his plant is operated, and there can thus be a pleasant exchange of views and experiences.

A year ago there was published in PIT & QUARRY a long article on this subject and the reader is referred to his files. We only wish to call operators' attention at this season of the year to the opportunity that they can now enjoy of visiting plants.

A. Acton Hall Passes Away

Just as we are going to press we learn of the death of Mr. A. Acton Hall, president and general manager of the Ohio Marble Company of Piqua, Ohio. Mr. Hall died on December 26. The news of his death comes to us as a shock, for it was unexpected and we held Mr. Hall in the same high esteem that his personality and his useful life earned from all who knew him. We regret that the lateness of the time at which the news is received prevents our giving an extended account of his life.

Missouri Valley Meet

An enthusiastic group of sand and gravel men attended the annual convention of the Missouri Valley Association of Sand and Gravel Producers at Kansas City on December 17 and 18. An important event of the meeting was the reduction of dues from 1 cent to ½ cent per ton. The election returns were as follows:

Frank W. Peck, president, Kansas City.

W. E. Rogers, vice-president, Tulsa, Okla.

R. J. Stewart, treasurer, St. Joseph, Mo.

District Representatives

Oklahoma—W. S. Dills, Muskogee, Okla.

Upper Kaw—F. A. Laughead, Topeka, Kas.

Lower Kaw—C. E. Todd, Kansas City.

Missouri River—A. E. Fisher, Glasgow, Mo.

Arkansas River—N. C. Dunn, Arkansas City, Kan.

If you are getting out only 50 yards a day and working 100 days in the year, you need

A Haiss Truck Loader

You'll make a saving on every yard you get out—savings that more than repay your investment.

It is the only machine of its kind that will dig sand and gravel right out of the bank, and put it in your trucks. The Haiss feeding propellers PICK the material loose and feed it to the buckets. They dig right in a path wider than the machine. No planking—the creeper treads carry the machine anywhere. You can't stall it—37 H.P. will dig almost anywhere. 2 YARDS A MINUTE CAPACITY.

WHY NOT INVESTIGATE AND START SAVING MONEY? ASK FOR CATALOG 523.

The George Haiss Manufacturing Co., Inc.

142nd St., and Rider Ave., New York City

HAISS

MATERIAL HANDLING EQUIPMENT

CLAM SHELL BUCKETS

PLYMOUT

Gasoline Loco

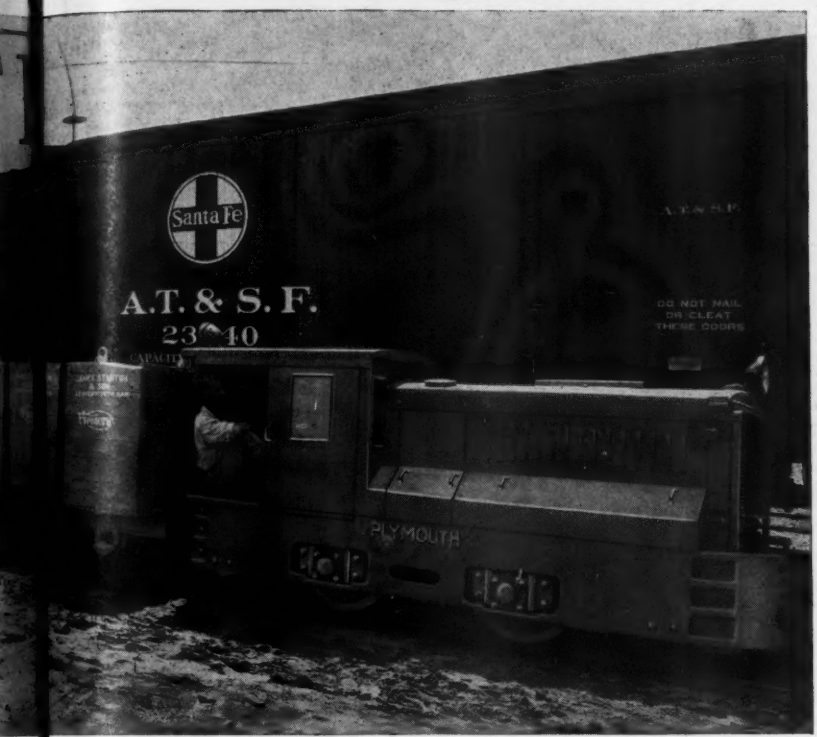
Nine Reasons Why James S on

James Stanton & Son of Leavenworth, Kansas, are b essive contractors of the middle west.

They have used Gasoline Locomotives of various m high-way construction for a number of years. Then a Plymouth speed Gear Drive Gasoline Locomotive was placed on their rails. thor-ough trial it was accepted and repeat orders for three m ouths followed. Now Plymouth Locomotives take care of their ulage.

Mr. Stanton states his decision in favor of the Plymo based on Nine Points of Superiority, which are set forth in adjo el. It will pay you to read Mr. Stanton's letter, as it comes fro who bought, used and knows. See this super-powered locomot e National Good Roads Show, or ask for literature.

The Fate-Root-Heath Company, 206 Riggs Avenue, Pl Ohio



on & Son Chose Plymouths

This Letter Tells Why

JAMES STANTON & SON
LEAVENWORTH, KANS.

FATE-ROOT-HEATH CO.,
Plymouth, Ohio.

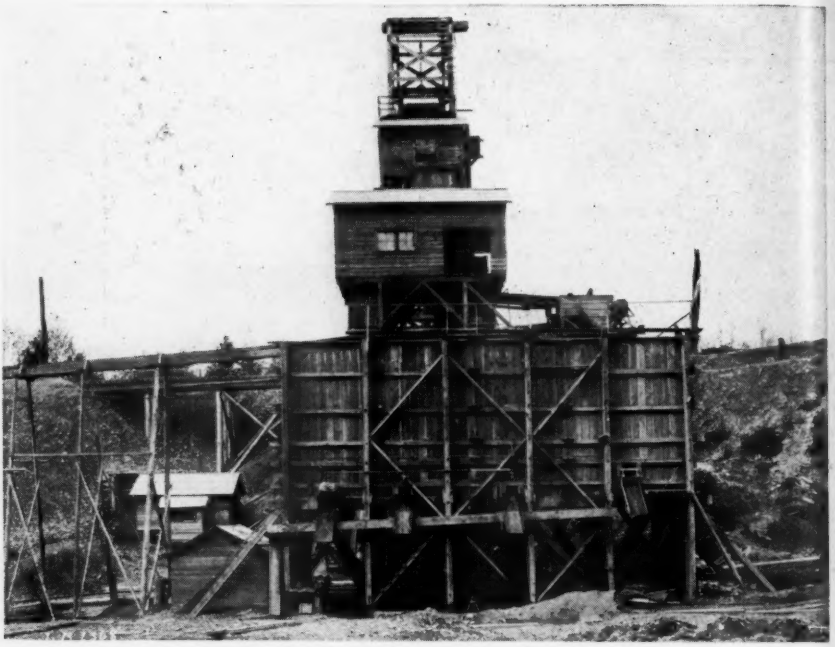
Gentlemen:

Following are nine points of superiority on which I based my decision in buying Plymouth Gasoline Locomotives:

1—Extra large driving wheels.
2—Location and convenience of control levers.
3—Only two driving chains to maintain.
4—Enormous brake leverage, fool proof, permitting greater speed with higher safety factor.
5—Unit parts enclosed, eliminating all dust and dirt in working mechanism.
6—Convenient location of sand boxes for filling; hot air draft from engine keeps sand warm and dry, insuring positive sand action.
7—Transmission gears extremely heavy; contractor can be sure of no trouble developing from this point.
8—All parts very accessible for making any adjustments that might be necessary.
9—Power plant designed to give greatest horse power with real economy, proven by actual test.

I am glad to say the performance of the Plymouths has fully justified my judgment.

Very truly yours,
JAMES STANTON & SON,
(Signed) James Stanton, Jr.



Gravel Washing at Longview, Washington

WHEN the officials of The Long-Bell Lumber Company of Kansas City, Mo., conceived the idea of building the model modern city of Longview, Wash., the question of obtaining large quantities of gravel and sand to be used in carrying out such a stupendous building program immediately presented itself. Roads, walks, homes, business and office buildings, factories, mills, and sewers all required such materials. In harmony with the thoroughness with which every phase of the undertaking was planned, they decided to build and operate a gravel washing plant as a distinct unit of this industrial scheme, and thus produce the material needed.

Such a decision was made only after exhaustive tests had been conducted by the engineering department of the company to ascertain whether or not the gravel formation found in the surrounding hills was not only sufficient in quantity, but would stand the tests to which gravel that must be used for the purpose contemplated must be subjected before being placed in improvements of such a permanent nature. Numerous test holes were sunk over a selected area and the showing made thereby conclusively showed that there was an abundance of material and further, that the formation shape and composition of the material sufficiently met and conformed to the necessary requirements. Therefore, in this selected area, approximately two miles north of Longview, the plant was located, covering an area of fifty yards square, exclusive of the gravel pit and the switch tracks and main line of

the company's independent railroad that connects it directly with the three great railroads of the Northwest—thus making the output of the plant accessible by rail and also motor transportation.

The plant is classified as a gravity feed type of washer. It is adequately built to withstand the great strain to which its operation necessarily subjects it. The base, or foundation, is built of re-enforced logs and timbers one and one-half to two feet in thickness. Upon this rests the main above ground structure of hoppers, and towers wherein are housed the material and plant machinery. The hoppers and bunkers are built of 2″ x 12″ planks supported and bound by 6″ x 6″ and 8″x12″ walings, while the skip tower and screen house tower are of laminated construction six ply 2″x10″ and four ply 2″x8″ planks respectively, in order to give greater flexibility. The entire framework is held together by heavy bolts with all corners and intersections reinforced by heavy iron plates. No nails were used in the framework of the main structure.

While not the largest plant in the state—some having a capacity of two thousand yards—it is approximately three times the size of the majority of plants in operation in this section of the country, having a maximum capacity of approximately eight hundred yards in an eight-hour run. The dimensions and capacity of the several units and equipment are best shown by actual measurements as follows:

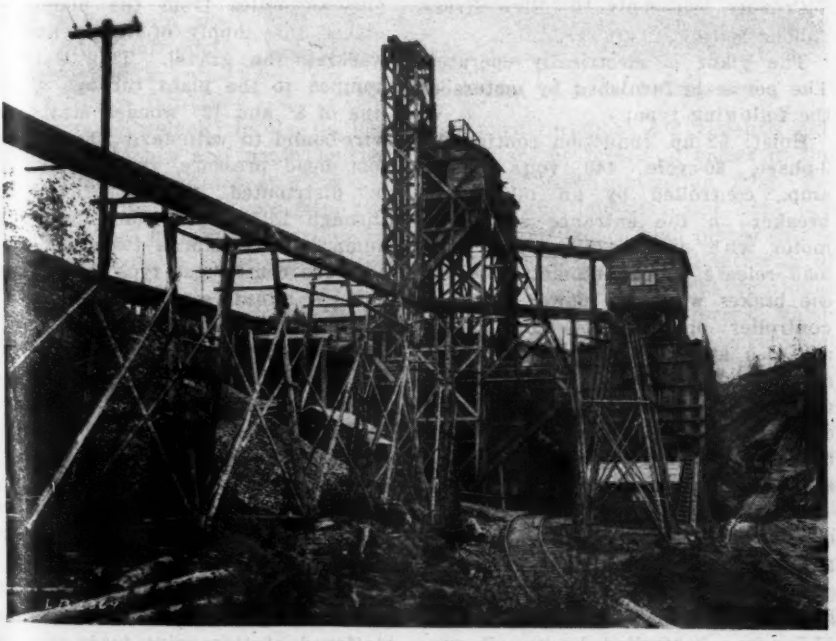
Initial receiving bunker, 20′ x 34′ with 35′ slope with covering wings 20′ x 18′ x 44′.

Three gravel hoppers, each 11′ 9″ x 20′ x 15′ 6″ deep.

Sand hoppers 15′ x 12′ 3″ x 23′ 9″ deep with intake chute 3′ x 3′ x 30′.

Oversize hopper, 5′ 5″ x 12′ 3″ x23′ 9″ deep with intake chute 3′ x3′ x 30′.

Skip tower, 105′ high.



Another General View of the Plant

Skip, 217 yds.; weight, empty, 2,800 lbs.; loaded, 10,800 lbs.

Counterweights to skip, 6,950 lbs.

Skip cable, ⅞", 6x25 P. F. S. wire rope.

Sluices (No. 1), 1' 10" x 1' 10" x 11' 15"; (No. 2) 1' 10" x 1' 10" x 9' 3"; (No. 3), 1' 10" x 1' 10" x 11' 5"; (No. 4), 1' 10" x 1' 10" x 47'; each having a drop of 34°.

Grizzly, 3' x 9' 8" overall, divided into two sections as follows: 3" opening 6' 8" long; 3" to 6" opening 3' long.

Sand boxes, 4' x 4' 1" x 4' 2" deep; counterbalance section 2' 1" x 4' x 2' deep.

Primary impact screen: 3' x 4' 6"; 3" mesh; ½" wire.

Secondary impact screen: 3'x4'6"; ⅜" mesh; ¼" wire.

Screen belts: 4-ply 4" Blue Streak rubber belting.

Loading chutes: 6" x 24" x 84" (2' perforated plate and hinged water pan).

Cable sheaves, 1' 15/16" x 18".

Crusher belt, 6-ply 10" Blue Streak rubber belting.

The plant is electrically operated. The power is furnished by motors of the following type:

Hoist: 52 hp. Induction continuous, 3-phase, 60-cycle, 440 volts, 72-110 amp., controlled by an oil circuit breaker on the entrance switch to motor with under voltage and overload release which automatically sets the brakes when the power is off or controller on "off" position. There are also attached to the cable drum shaft two push buttons which makes contact and automatically cuts off the current and sets motor brakes upon the counterweights and skip reaching a danger point in ascending.

Crusher: 40 hp. Induction continuous, 3-phase, 60-cycle, 440 volts; 48.5 amp. Distance from shaft, 22 feet.

Water pump: 75 hp. Induction, continuous, 3-phase, 60-cycle, 2,200 volts, 17.7 amp.; controlled by an oil current breaker with rating A. 200 V. 2,500.

Primary Impact screen: 2 hp. Induction continuous, 3-phase, 60-cycle, 400 volts, 3.15 amp. Distance from shaft, 11 feet.

Secondary Impact screens: 2 hp. Induction continuous, 3-phase, 60-cycle, 440 volts, 4.5 amp. Distance from shaft, 13' 6".

Electric signal buzzers placed in the stations of the several operators are the means of communicating throughout the plant while in operation. Electric lights are generously placed about the entire plant and area for operating at night.

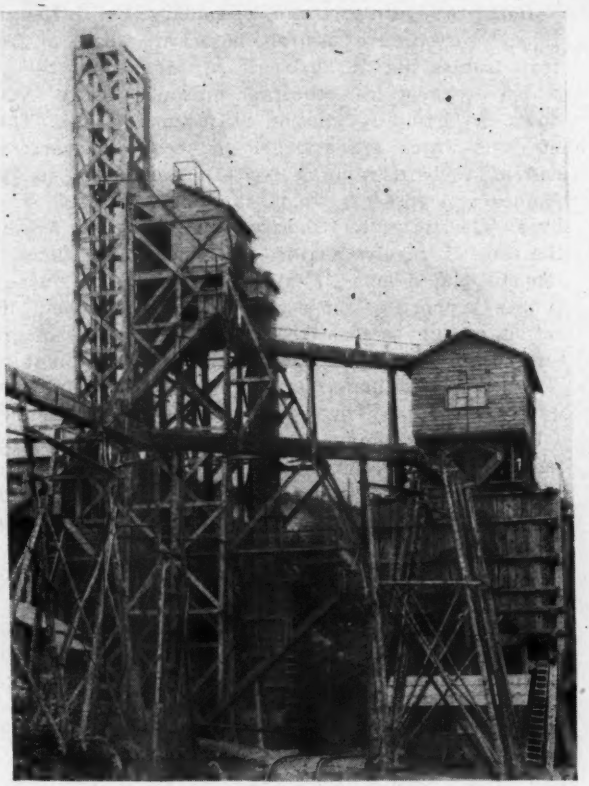
In order to use the medium size "oversize," a rock crusher is operated as a unit of the plant. It is located directly over the initial receiving bunker, is fed from the grizzly by means of a chute, and discharges the crushed rock into the initial receiving bunker. It is an 8" Traylor Bull Dog Gyratory Crusher.

A slough, approximately one and one-half miles from the plant, furnishes the supply of water used in washing the gravel. This water is pumped to the plant through a pipe line of 8" and 12" wooden stay pipes, wire-bound to withstand 200 and 300-foot head pressure, respectively, and is distributed through the plant through 2" and 3" iron pipes. The pump is a 5" Moran two-stage, high pressure centrifugal type, of 900 gallons per minute capacity.

One can more easily visualize the operation of washing gravel by tracing a load of material from the gravel pit through the washer. Sent from the pit to the washer in the Standard railway dump cars, the gravel is dumped into the initial receiving bunker from which it is fed into the skip, hoisted to the top of the skip tower and dumped into a hopper, located above the grizzly and primary impact screen. An operator stationed at this point feeds the ma-

terial onto the grizzly, which is located directly over the primary impact screen. The washing process begins at this point. As the material falls upon the grizzly it is thoroughly drenched by a great volume of water which is continually playing upon the grizzly from three-inch pipes located above it.

The function of the grizzly is to separate or sort the material by means of the various sized openings in it. Material three-inches in size and over, immediately passes to the second section of the grizzly which contains rectangular openings through which all material 3" to 6" in size falls into a chute through which it immediately passes into the crusher to be reduced in size to less than three inches and again hoisted for washing. Material over 6" in size passes over the grizzly and falls into the "oversize" hopper—no further effort being made to either wash or reduce same in size.



View Giving Idea of Flow of Material

All material under 3" in size falls through the first section of the grizzly onto the primary impact screen, the mesh of which is three inches and permits such material to fall through it into the washing sluice or launder.

The material thus having passed through the primary impact screen into the first launder, is carried downward in a zigzag course through the series of launders, each of which has a fall of 34°, at a terrific speed by a heavy flow of water which is kept in a most turbulent and violently agitated state by means of baffles in the nature of fins protruding from the sides of the launders and bars one and one-half inches high placed in the bottom of the launders at intervals of three feet. The material continues through this washing process, which separates it, removing the dirt, sand and other foreign matters from the gravel, for a distance of eighty feet, when it falls from the launder onto the secondary impact screens. There are two of these screens arranged in an inverted "V" manner and so placed beneath the launder that the material falls in approximately equal parts upon each screen by reason of coming in contact with a dividing partition placed at the mouth of the sluice

Both the primary and secondary impact screens are securely bolted to iron frames set at an angle of 34°, which are kept in a constant up and down or "bumping" motion by means of cams which are attached to each end of a shaft, running beneath the frames and screens, which is driven by an electric motor, thereby causing the cams to revolve against three-inch toppets placed on the sides of the frames supporting the screens. This action of the screens keeps the material in motion while upon them and causes it to pass under sprays of fresh water which play upon the screens.

Upon being dumped upon the secondary impact screen this mixture of dirty water, gravel and sand immediately undergoes a second cleansing. The dirty water and sand at once fall through the screen into a sluice which carries same into the sand boxes where the sand accumulates in the bottom of the boxes until its weight, becoming greater than the counterbalance at the rear of the boxes, automatically tips the boxes forward, thereby opening the drain pipes in the bottom of the sand boxes releasing the sand into the sand hopper. The dirty water runs over the front edge of the sand boxes into an overhead flume which carries it away from the plant.

The larger material, pea gravel and gravel under three inches, is carried or rather "bumped" across the screens, a heavy spray of fresh water playing upon it, until it falls off into picking chutes leading into the gravel hoppers. The bottom of these chutes are made of wire screen with ⅜-inch mesh and as the gravel passes over them more fresh water is sprayed upon it—the water draining off through the screens into the overhead flume—the gravel falling into the gravel hoppers, ready to be loaded into cars for shipment.

The washing process, however, is not yet completed. As the gravel is being run through the loading chutes with the cars it is subjected to a final bath of fresh water which is sprayed upon the gravel from pipes located directly over the door of the loading chute. This water drains off through the perforations in the bottom of the chute as the gravel falls into the cars—clean and ready for the contractor.

An average of 18,000 yards of gravel are taken from the pit each month and since operations were started in October, 1923, approximately 220,000 yards of gravel have been taken from the plant for use in building the city of Longview.

Longview has grown by leaps and bounds during the past few months. On land that was formerly dotted by farm houses, miles of wide streets are being graded and paved and sidewalks and water mains put in; a dozen masonry business structures have risen from the earth and more have been started; a six story fireproof hotel is the mecca for scores of visitors daily; two banks are doing a good business; 350 modern residences and two attractive apartment houses have been completed; an up-to-date school building and imposing community house are being built.

On the banks of the Columbia river an immense power plant and the first manufacturing unit of what is designed to be one of the world's largest lumber manufacturing operations, are under construction and work is underway on large docks equipped to handle cargo with the great ocean-going freight vessels that steam up the Columbia from all parts of the world.

Thirty miles north of Longview on the border of a vast kingdom of trees, the town of Ryderwood is being built. It will be the center of logging operations for the Long-Bell company and houses and store and office buildings are being built to accommodate a city of from 3,000 to 4,000 people.

Extending from Longview to Ryderwood, construction is forging ahead on a double track standard gauge rail-

Showing Deposit and Excavating Methods

road. This road connects with tracks of the Northern Pacific, Union Pacific and Great Northern at Longview, thus giving the city direct mail communication with the entire western coast.

Thousands of men are employed in building Longview and allied projects. Great strides of progress have been made in construction during the summer and will continue unabated during the winter.

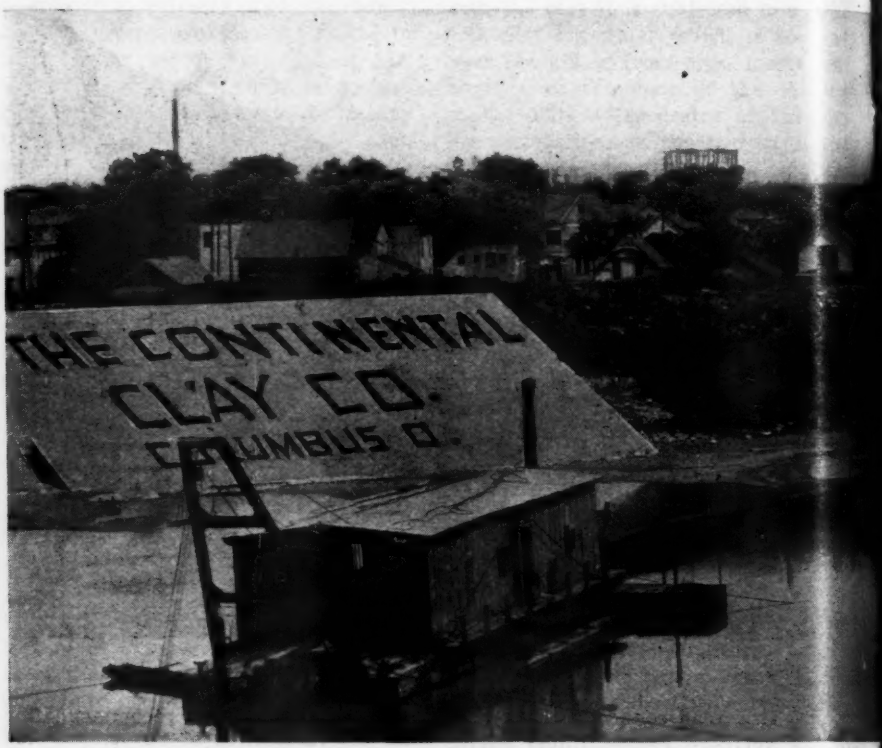
Compressed Air Literature

Standards adopted by the Compressed Air Society has just been published, embodying the result of extended study and research on the part of the executives and engineers associated with the members of that organization. It embraces the nomenclature and terminology relating to air compressors and their operations; a history of the development of speeds of air compressors; an explanation of capacities and pressures; instructions for the installation and care of air compressors and illustrations of devices suggested for cleaning the intake air; recommendation for the lubrication of air compressing machines and the cleaning of air receiver piping; a description of the low pressure nozzle test recommended by the Society, and a partial list of applications of compressed air.

The Compressed Air Society publishes this pamphlet with the belief that there is a need for such an authoritative work of reference and that compressed air engineers and users as well as manufacturers of air compressors will appreciate this step toward the establishment of definite trade standards in the industry.

Copies may be had from the members or by addressing the Secretary of the Society, C. H. Dohrbach, 50 Church St., New York.

The complaints of four cement companies in Northampton county, Pennsylvania, against successive increases in electric power rates of the Pennsylvania Power & Light Co., have been dismissed, according to the Public Service Commission. Complaints were filed by the Alpha Cement Company, Nazareth Cement Company, Coplay Cement Mfg. Co., and the Penn-Allen Cement Co.



Plant, Barge and Swintek Screen Nozzle

Digging Gravel in the Heart of a City

One of the typical and rather picturesque sand and gravel producers of central Ohio is the Continental Clay Company of Columbus, formerly and for years known as the Southern Sand and Gravel Company.

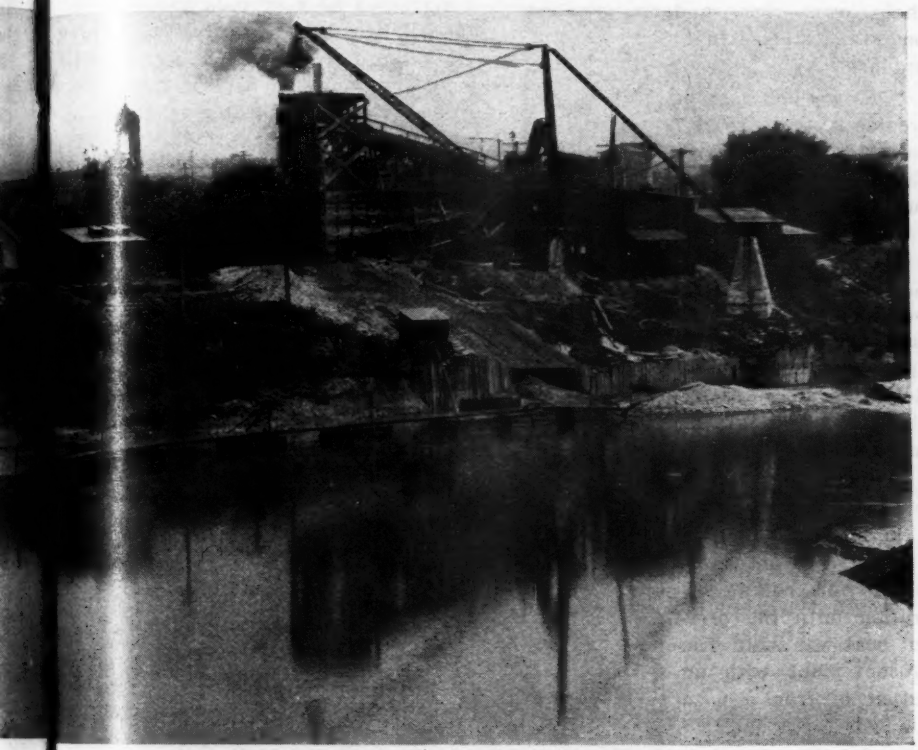
Rather more than ordinary interest attaches to this plant because of the fact that it is practically in the heart of the city, for it is located on the Scioto River at Long and High Streets, scarcely half a dozen blocks from Main Street and the state capitol.

The Swintek System

Most gravel plants convey their material from nature's bosom to the tipple by means of the familiar dragline bucket and cable arrangement, and this formerly was the method employed here. Now, however, a dredging pipe-line system is in operation which travels near or far with ease and operates from any distance with equal facility.

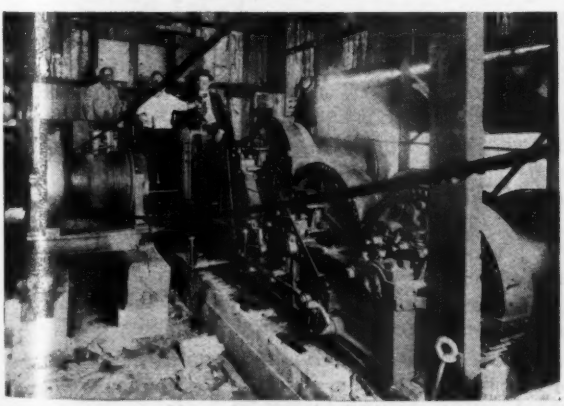
Sucked up from the river bed through the agency of a Swintek Traveling Screen Nozzle, the sand and gravel is conveyed by pipe to the bank of the river directly below the plant. From this point, it is scooped up by an Owens 1½ yd. bucket, which is elevated to the tipple by an electric crane of strictly home built construction, which in turn is operated by a 100 horsepower Thomas hoist.

In describing the equipment of his plant, Mr. David Broadfoot, superin-



Continental Clay Company, Columbus, O.

tendent, stated that the electric crane, whose measurements are 80 ft. boom, 48 ft. mast and 67 ft. stiff leg, was built entirely by himself and his men. This statement led to further conversation, which revealed some interesting facts concerning the history and early operations of the original company.



Hoist Room, Showing Thomas Hoist in Operation

Company History

Back in 1908 four employees of the Hocking Valley Railroad—Henry Winter, David Broadfoot, W. H. Loughbridge and W. O. Loudenslager, then, and for more than 15 years previously, mechanics and foremen for the Hocking Valley Railroad, formed a partnership to build and operate a sand and gravel producing concern. Lacking sufficient capital at first, these men organized a stock company, put up a tipple themselves, built

their own rigs and boats and started in to produce.

"Oh, we had lots of trouble in those years," said Mr. Broadfoot with the seasoned good nature of a typical old "war horse"—"enough trouble to fill a book. In 1913 the flood scattered our boats and barges and fire burned up our digging boat. But with all our trouble, it has been a very successful company."

Later Mr. Broadfoot and his partners built a rig on the island, with a stiff leg derrick, which remained in operation until the present boat was built. The present plant with an output of from 600 to 800 yds., (capacity of 1,000 yds. or more) was built throughout, as was the crane, by Mr. Broadfoot and his men. No one would ever suspect it to be anything but factory built, however.

Showing Four Link-Belt Screens, Tipple Crane and Owens Bucket

Growing weary, apparently of overmuch success and prosperity, the four partners on December 1, 1922, sold out their interest in the business to the Continental Clay Company, Mr. David Broadfoot remaining as superintendent. By this sale, one more unit was added to the interests of the Continental Clay Company, among which are the Glacial Sand and Gravel Company at Gilbert, near Zanesville, and various building supply yards, and a brick yard in Columbus.

When asked whether the supply of material might not soon be exhausted because of the plants location in the heart of the city, Mr. Broadfoot replied that the company three years ago secured a franchise from the city covering a period of 15 years, and that they owned or controlled land some 800 feet wide by two miles long, all of which assures continuous operation for many years to come.

Barge Equipment

Power at the barge is supplied by a 350 horsepower Westinghouse motor. A 12 inch American Manganese pump

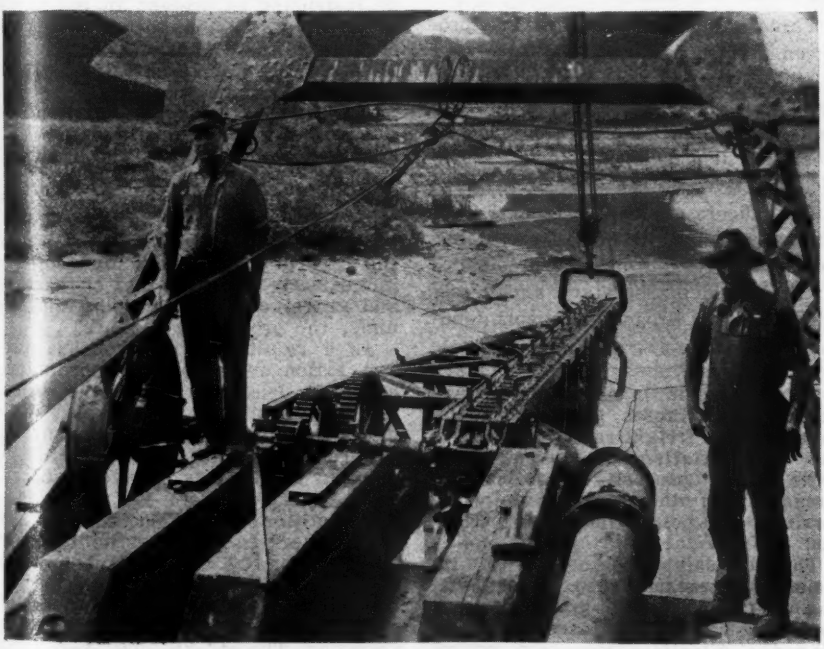
is used, operated by a 20 horsepower Orr and Seaborn engine (General Electric motor). A Dayton Dowd priming pump is used on the barge also, operated by a 10 horsepower Western Electric motor and a 25 horsepower Robins and Myers motor runs the Swintek Cutter. Twelve inch black steel standard pipe carries the material to the plant and the dredging sleeves are made by the Cincinnati Rubber Company.

Plant Equipment

In the plant itself four screens are used in tandem. These are Link Belt screens, all 31 by 56 inches, and 7 feet long. Crushers employed are a No. 5 Austin and a No. 3 Gates. Water used in washing the material in the plant is pumped up by a "Union" pump, (made by the Union Pump Mfg. Co. of Battle Creek, Mich.) and operated by a 30 horsepower Allis-Chalmers motor.

The conveyor, which is a Webster

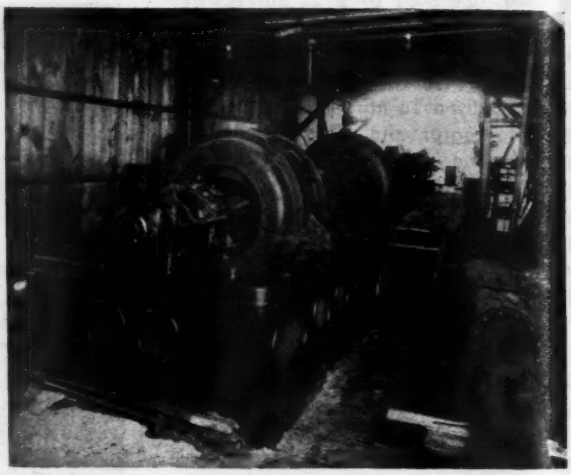
Mr. David Broadfoot, Superintendent



Swintek Traveling Screen Nozzle

of 55 foot center, was made specially to order. In addition to the plant made electric crane, a Byers ¾ yd. Autocrane is used in loading trucks from stock.

The entire plant, of course, is electrically driven. Current, 13,000 horsepower in quantity, is received in the shed on the river bank to the left of the plant from which it is distributed to the various motors, 2,300 horsepower going to the barge in the river.



Electric Power Units on the Barge

The plant has two Smith Engineering settling tanks, of 125 cubic feet capacity. There are eight storage bins with a total capacity of 2,000 tons. Six men are required regularly in the operation of the plant.

Three grades of material are produced, namely, ½ inch, 1½ inch and 2 inch. Hauling of the material is done in Sterling trucks, of which the company has 22. The scales used in weighing trucks is a Howe, 30,000 lb. capacity.

The officers of the Continental Clay Company are: W. B. Ferris, president; Frank H. T. Potter, vice-president; C. E. Berridge, secretary and treasurer; David Broadfoot, superintendent.

A new factor in the cement rate case in the Kansas gas belt is the complaint on freight rates charged for the transportation of cement from mills to the gas belt—Iola, Chanute, Fredonia and other towns in the same territory—to points in western Kansas.

The complaint alleges that the intra-state rates published by the sixteen carriers which are made respondents, are comparatively higher than the interstate rates on cement from St. Louis, Des Moines and other points in Missouri and Iowa.

In order to maintain the scenic beauty of the Arroyo Seco, the Los Angeles City Council killed the agreement of November, 1922, with Henry W. Hawley, president of the Los Angeles Rock & Gravel Company, and recommended that the city attorney be instructed to present an ordinance prohibiting the operation of rock crushers in the official bed of the Arroyo Seco or excavation within 1,500 feet of each side.

Mr. Hawley declared the proposed ordinance was unconstitutional and called attention to the fact that the strip of land owned by his company, on which excavating has been going forward since 1913, is declared a public menace while excavating done by the City of Los Angeles on property immediately adjoining that of the rock and gravel company is not a menace under the proposed ordinance.

As a result of the vigourous protest, action on the proposed ordinance has been delayed. In the meantime, the city engineer will prepare estimates covering the cost of dismantling and removing the city's rock crusher plant to the vicinity of Avenue 20.

A petition was filed recently by stockholders to dissolve the Potomac Valley Stone & Lime Company of Hagerstown, Md. The company recently sold their large quarries at Pittsburgh to the Keystone Limestone Company. The stockholders desire the assets distributed, the company having no liabilities.

Association of Science Meet

The preliminary announcement of the seventy-eighth meeting of the American Association for the Advancement of Science and Associated Societies, which is to be held in Cincinnati December 27, 1923, to January 2, 1924, has been announced by the Association.

This is the third Cincinnati meeting of the Association. It is to be a jubilee meeting, with special features in celebration of the completion of seventy-five very successful years of association life. The first Cincinnati meeting was held in May, 1851, the second in August, 1881, both of them very successful.

The main activities of this Association are, the holding of the annual and other meetings, and the support lent toward the publication of the journal, "Science."

New Ohio Gravel Company

Articles of incorporation were recently issued by the Secretary of State of Ohio for the Western Ohio Gravel Company in the sum of $500,000. The incorporators are F. D. Coppock, C. E. Patty and Guy C. Baker of the Greenville Gravel Company, and Harry Donnelly, Edward Donnelly and Earl Zimmerman of the Ohio Gravel Ballast Company.

All of the stock will be owned by the Greenville Gravel Company and the Ohio Gravel Ballast Company jointly. The new corporation is taking over several gravel operations in western Ohio.

Officers of the new company are F. D. Coppock, president; Harry Donnelly, vice-president, and C. E. Patty, secretary-treasurer. The main office will be at Greenville, Ohio.

Blacklick Sand Company, Johnstown, Pa.; capital, $75,000; purpose, mining, digging and quarrying clay, stone and other materials. Incorporators: J. C. Davies, Johnstown; W. H. Smith, Ebensburg; H. F. Bentz, Ebensburg.

Denigris Brothers, Bronx, New York City; capital, $6,000. Granite and stone. Incorporators: L. J. Marrell, S. M. Wittner, A. Lader. (Attorneys, Anderson, Phillips & Moss, 565 5th Ave., New York.)

Explosives Used in October, 1923

Sales of explosives in the United States during October for domestic consumption amounted to 624,451 kegs of black blasting powder, 4,521,737 pounds of permissible explosives, and 18,045,394 pounds of other high explosives. Each of these figures represents a larger volume of sales than in the preceding month of September, but a slight decrease as compared with the amount sold in October a year ago. The figures are based upon reports received by the Bureau of Mines of the Department of the Interior from manufacturing companies whose yearly sales represent approximately 85 per cent of all black powder used in the United States, 88 per cent of all permissibles, and 81 per cent of all other high explosives.

Of the total amount of explosives sold in October, the mining industry (coal and metal) consumed 87.5 per cent of the black powder, 95.3 per cent of the permissibles, and 51.8 per cent of the other high explosives.

Set for Big Road Show

The demand for space at the road show of the American Road Builders' Association to be held in Chicago January 14 to 18 has proved so great that it has been necessary to add the Wilson Building to the group of structures which will house the show. Every inch of space in the Coliseum, the Coliseum Annex and the Greer Building was taken several weeks ago and since that time C. M. Upham, convention and show manager, has been trying to get additional room for those for whom it was impossible to provide when the original allotment was made.

Through an arrangement with the Austin Machinery Corporation, The Wilson Building has been obtained and will add 4,600 square feet to the floor area of the road show, making it the greatest exhibit of road machinery and materials in the history of the country. The Austin Machinery Corporation will occupy part of the Wilson Building and the remainder will be given over to the exhibit.

Leicester Lime Corporation, Boston and Leicester, Vt.; quarries; capital, $475,000. Incorporators: John F. Linder, Canton, Mass.; George Von L. Meyer, Hamilton, Mass.; John F. Linder, Jr., Canton, Mass.

General view of the enormous quarry operations.

A Big "Safety First" Stone Crushing Plant

A crushed stone quarry operation second in size only to the Marble Cliff Quarries Company of Columbus, in the state of Ohio, is the American Crushed Rock Company located at White Sulphur. In addition to its size, it is a new plant, having been built in the spring of 1923, and lastly, it is a strictly "Safety First" institution with its "risk" stock standing well above par.

Incidentally, it may be mentioned that the material used in the American Crushed Rock Company was salvaged entirely from two older plants which were dismantled for that purpose, one on the grounds, the other at Marblehead. The rock crushing plant was newly built in 1923. However, the company's lime plant has been in operation here for ten years past.

A Big Operation

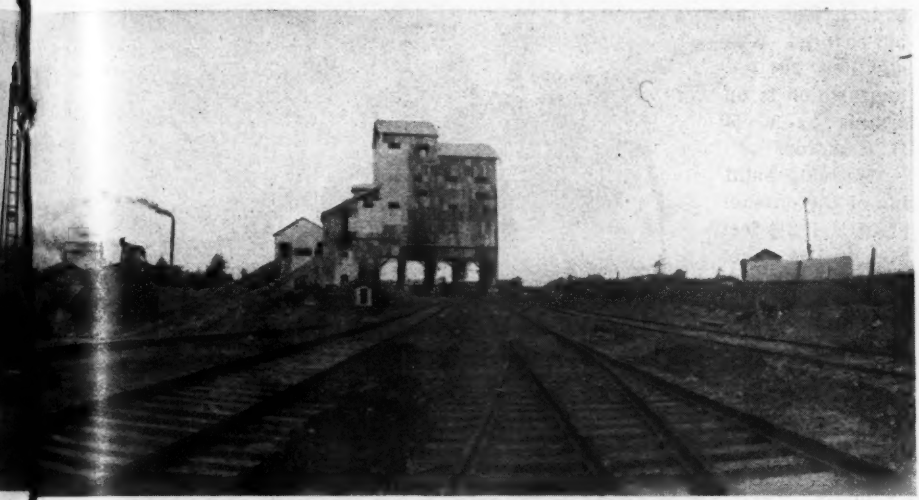
From the runway of the primary crusher building a very large operation is presented to view. The quarry bottom is a quarter mile across and covered with a network of rails, locomotives and strings of cars. On the left is a revolving shovel at work loading cars. On the right hand is another shovel and on the upper edge on either side are electric drills preparing holes for dynamiting.

On the upper edge on either hand are also steam shovels engaged in stripping work, and half a mile or more distant, further stripping is being done, on a large scale, preparatory to doubling the output of the entire operation next spring.

Quarry Equipment

The American Crushed Rock Company owns 300 acres of land and employs a total of 102 men in its rock crushing and lime manufacturing plants.

The company's equipment consists of: One Bucyrus 70-ton, 3-yard steam shovel and one Bucyrus 90-ton 5-yard shovel; two Marion 3-yard stripping shovels; one Thew ¾-yard revolving shovel; and one Osgood ¾-yard shovel.



being extended widely to the left for next year's operations.

Five well drills are used in sinking holes for the placing of blast charges. Of these, two are Sanderson Cyclones (electric), two are Loomis Clippers (gas), and one is a Loomis Electric. Trojan 40 per cent dynamite is used.

The industrial locomotives are used only in the switching and hauling of stone cars. These are one American 30-ton and two American 25-ton locomotives. The cars used are 6-yard side dump Koppels, of which the company owns 20.

This is the extent of the equipment used in the quarry itself. In the big stripping operations going on at the time these pictures were taken, three large locomotives—leased from the New York Central Railroad—and 80 12-yard dump strip cars were also in use.

Plant Equipment

The main building of the stone crushing plant does not house the primary crusher. This crusher, which is a No. 18 Worthington-McCully (36-inch) operated by a 200 H. P. motor, is located in a smaller building nearby. The primary crusher plant is reached from the quarry by a Thomas two-way balanced hoist, operated by a 100 H. P. electric morot. With this hoist a full car is drawn up and an empty car lowered back into the quarry simultaneously.

General view of lime plant, American Crushed Rock Company

From this primary plant the material is then transferred to the main plant by a

36-inch 8-ply rubber-covered Webster belt, 204 feet long, which is operated by a 50 H. P. motor.

The main building of the crusher plant is 112½ feet high, 100 feet long and 50 feet wide. This plant is equipped with two No. 7½ Allis-Chalmers crushers, one No. 4 Allis-Chalmers and one No. 6 Allis-Chalmers, each operated by a 50 H. P. motor.

There are four double-deck Allis-Chalmers Shaker Screens, and four 60-inch by 28 foot revolving screens, made by the Greenville Manufacturing Company. In the conveying of materials on their various routes from crushers to screens and finally to the storage bins, two 24-inch 6-ply rubber covered Webster belts are used; also two Webster steel elevator conveyors, with 30-inch buckets.

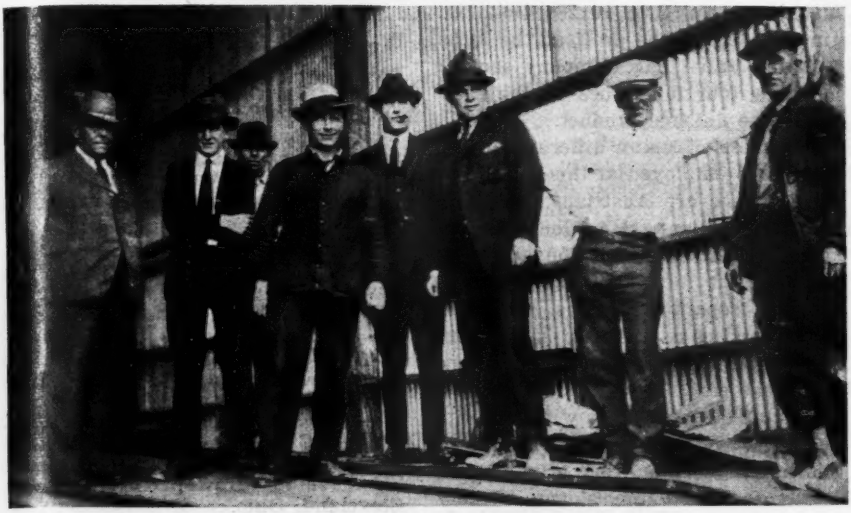
The balanced hoist, showing cars being elevated to the big primary crusher

Showing where the lime is burned

For quarry draining purposes two Weinman pumps are used; one an electric of 8-inch suction and discharge and 1,500-gallon per minute capacity, and one steam pump of 6-inch suction and discharge. The face of the quarry averages 35 feet, the stripping from 2 to 20 feet.

Both the stone crushing and lime plants are equipped on every floor throughout with 2-inch water lines for fire protection with 70-pound water pressure. Electric power received at the power station is 13,500 volts, which is transferred to 440 volts A. C.

The capacity of this plant is 4,500 tons per day of 10 hours. The sizes of materials produced are: 2½ inch, 2 inch, 1 inch, ¾ inch, ⅝ inch and dust. There are nine storage bins with a total capacity of 1,500 yards



Just after installation of improvement. The modest, semi-visible gentleman in white is Supt. Bushman, Gen'l. Mgr. C. B. Moon to his right (left in picture.)

and the material produced is sold "to everybody."

A total of 14 electric motors are used in the operation of the various units, ranging from 10 to 200 H. P.

Lime Hydrating Plant

The lime hydrating plant of the American Crushed Rock Company, which has been in operation for the last ten years, has ten kilns, and a capacity of 60 tons of lime per day.

The hydrator used is a Clyde. The crusher is a Rotary fine, made by the Sturtevant Mill Company. A Fairbanks Morse gas engine operates the hydrator, elevator, mill and sacking

Car dumping into hopper of No. 18 Worthington-McCully 36" primary crusher

machine. An Erie 10x28 steam engine is used for the draft on the kilns. A Bates Valve Bag Company sacking machine, four tube, does all the sacking of the finished product.

Workmen of many different nationalities are employed at this big operation. There are Austrians, Russians, Polacks, Italians, Macedonians, Negroes and Americans. The camps of the different races are, therefore, located in separate sections. The foreign camp lies on the west, the American on the east, and the Negro on the south-east side.

A point of great pride with Superintendent A. Bushman, generalissimo of this heterogeneous army of workmen, is the fact that the slogan "Safety First" is so well observed by all men on the premises. The American Rock Crusher Company has an unusual record in the matter of accidents, for throughout the dangerous work of dismantling the old buildings and the constructing of the new, with the many opportunities for injuries in the installing of the heavy crushers and other equipment, there have been practically no accidents—no broken legs, arms, or heads and no hospital cases. Mr. Bushman gets his men together regularly for little impromptu talks on the subject of "safety first" and first aid demonstrations for injured men, and the results repay him well for his concern. Every man has learned to watch his step most circumspectly!

The officers of the company are: A. S. Hecker, president; C. B. Moon, vice-president; C. Wood, secretary-treasurer; A. Bushman, superintendent. Mr. Bushman has been in the stone crushing game for 17 years.

The stone quarry and lime quarry companies are organized separately, with separate and distinct officers. However, their personnels overlap, and they are to all intents and purposes one company.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,474,356. Loading and conveying apparatus. James C. French, Chicago, Ill., assignor to F. C. Austin Machinery Co.

1,474,383. Wagon-loader. Leslie A. Russell, Chicago, Ill., assignor to F. C. Austin Machinery Co.

1,474,568. Shovel. George H. & Andrew C. Sylvester, Cary Station, Ill.

1,475,729. Sand cutting and screening machine. Howard L. Wadsworth, Cleveland, Ohio.

1,476,121. Excavating-scoop. George E. Wagner, and Robert R. & Robert M. Downie, Beaver Falls, Pa., assignors to Keystone Driller Co., same place.

1,476,535. Hoisting-machine. Thomas S. Miller, South Orange, N. J.

1,476,536. Bucket and associated parts for cableways. Thomas S. Miller, South Orange, N. J.

1,476,702. Drum or screen drive and supporting means. Walter Ferris, Milwaukee, Wis., assignor to Bucyrus Co., South Milwaukee, Wis.

1,476,726. Mining-machine. Thomas E. Pray, Chicago, Ill., assignor to Goodman Mfg. Co., same place.

1,476,880. Gravel crushing and screening device. Horatio S. Earle, Detroit, Mich., assignor to Acme Road Machinery Co., Frankfort, N. Y.

1,476,897. Loading apparatus for mining. Nils D. Levin, Columbus, Ohio, assignor to Jeffrey Mfg. Co., same place.

1,477,353. Rock-drilling engine. Charles A. Hultquist, Los Angeles, Cal.

G. E. Williams, vice-president of the Universal Gypsum Company of Chicago, has announced his company will begin at once the construction of a $250,000 plant on the 460 acres of land near Rotan, Texas, purchased a year ago for $80,000. The plant will have a daily output of 200 tons and will employ a hundred men. The company now owns plants at Fort Dodge, Ia., and Batavia, N. Y.

Private Power Plants for Quarries

By S. J. H. WHITE, Sales Engineer, Erie City Iron Works.

The larger quarries are now equipped to a great extent with electric motor drives, the sources of power frequently being a central station, yet inefficient steam boilers are usually required for driving steam drills, air compressors, pumps or other apparatus.

The object of this article is to show that all the power requirements may be generated by a private power plant, at less expense and with more satisfactory results, than the temporarily popular plan of purchasing power from outside sources.

Generally speaking, in event the power requirements of a quarry or other industry average less than 150 H.P., or 100 K.W. in electric installations, and the central station power rates do not exceed 3½ cents per K.W.H. (including customary "surcharges," "demand charges," "power factor penalties," and the like) it may prove advisable to operate the quarry or other industry with central station power. Local conditions will determine this matter.

But when the power demands exceed that mentioned in the preceding paragraph, power may be produced with a private power plant, nine times out of ten, at decidedly less cost than the central station can or will furnish a similar volume of power.

The usual objection raised by business men against the private power plant is the "fixed charges are high"—this is an objection of course—but unfortunately the fact remains that it does not matter who owns the power plant supplying the necessary power to operate a given industry, the consumer of the power must pay, and does pay, the fixed charges on that plant.

In event a central station supplies the power, the consumer's estimated proportion of the total fixed charges on the central station is collected monthly under the customary terms of "demand charge" or "readiness to serve charge," or possibly some other term, or may be and sometimes is entirely concealed by the high rate of the first step of a series of decreasing rates. The fact remains, however, that the consumer is compelled to pay his part, or more, of the fixed charges on the central station.

In order to prove a financial success the central station must include in its rates all of the interest on investment, taxes, insurance, depreciation, obsolescence, repairs, and the like, not only on the power plant itself but on its elaborate offices, extensive pole lines, substations, meters, transformers and like devices.

Further, the rates must include the high salaries of executive officers, salaries of administrative employes, and the wages of a large operating force consisting of engineers, firemen, linemen, meter maintenance men and readers and others. Compare these costs with the insignificant cost of one or two engineers and firemen in a private power plant.

The above costs are all chargeable to "fixed charges" on the central station and are covered and collected for by the "demand charges" on every consumer's power and light bill. In addition to these charges entering the cost of producing power must be added the cost of fuel, water, cost of treating water, lubricating oils and the like, all of which are covered in the rates for power. So in reality the consumer pays for the coal consumed in producing the power he purchases and all the other numerous expenses, high salaries and other costs, and incidentally adds a sufficient amount to pay dividends to the stockholders of the central station.

The customary central station practice, roughly, is about like this: It estimates the total cost of items mentioned in Paragraphs 5 and 6 for a period of one year, divides this amount by 12—to establish monthly quota—and divides this amount or quote by the K.V.A. capacity of the plant; the result is the basis on which the consumer's "demand charge" is figured—usually based on K.V.A. capacity reserved for each consumer.

The contract with consumer usually provides that the "demand charge" is to be a given number of dollars and cents per K.V.A. transformer capacity furnished the consumer. It usually also provides that the "demand charge" is to be paid each month whether or not the volume of power consumed is equal to the "demand charge."

Then the central station eliminates coal consumption at various load factors, power factors and the like, and establishes its "power rates" on a sliding scale, reducing rates as volume increases; all of which is based on business logic and principles.

Exactly similar factors determine the cost of generating power with private power plants; in the latter case, however, the fixed charges are confined to the power plant investment exclusively and the wages of a small operating crew; high salaries paid executive officers and others are not and should not be included.

Again, with proper management, the 6 per cent interest, 5 per cent depreciation and 5 per cent repairs, charged as fixed charges on a private power plant, will be deposited in a bank at interest monthly, in 12 equal installments, and will not be drawn against except to make necessary repairs and replacement of worn parts. In the event this plan is followed each year it will be found at the end of twenty years that an amount of money decidedly greater than the original cost of the plant is available in the bank. The burden of making the monthly deposits will be less great than the burden of donating equal or larger amounts to a central station under the term "demand charge" or some such term.

In the event these deposits are made as suggested, the plant will pay for itself in less than twenty years on the basis of fixed charges alone, even though the total cost of generating power equals the cost of central station service, but central station service invariably exceeds the cost of private plant service; the savings by generating power will usually pay for the plant in less than five years. clearly the possibilities of generating

Again, at the end of twenty years power very cheaply with private power plants, even as small as 250 K.V.A. capacity.

The actual test on which this data sheet is based was made several years ago; modern engines, boilers and furnaces with modern methods of firing boilers will show decidedly better results. But central stations cannot compete even with the results shown.

One of the greatest causes of waste and loss in operating small power plants is the improper method (lack of method is nearer the facts) of firing the boilers. In the past this has been practically impossible to correct and overcome, as the economy of the boiler plant was at the mercy of the firemen, and depended to a very large extent on the intelligence and character of the men shoveling coal.

Today, however, coal pulverizers are available which automatically, or practically so, feed the coal and air supply in the correct ratio to obtain the highest efficiency of combustion.

Further, one man can handle a battery of boilers and pulverizers where formerly one man was required for each boiler or perhaps two boilers. This scheme reduces the cost of firing to a minimum and cuts consumption enormously.

Where 4 to 6 pounds of steam were formerly obtained per pound of coal with hand fired furnaces, coal pulverizers will produce 8 to 9 pounds of steam per pound of coal, even when using an inferior grade of coal.

The writer recently visited a plant of 500 boiler horse power rating, the owners of which claimed a saving of 50 per cent in coal consumption due to the installation of coal pulverizers.

The plant referred to in the above paragraph is obtaining fully as good if not higher, evaporative efficiency as the average large central station equipped with all modern coal saving devices and expert supervision.

Of course the piston, slide or oscillating valves, used on steam engines years ago, soon leak steam. Economies were not high on such engines when new, and gradually became lower and lower as the valves and their seats became worn.

Today the best engines are provided with "poppet" valves which remain tight indefinitely; as they require very little power to operate them the mechanical efficiency of such engines is very high—as high or slightly higher than 98 per cent in the Lentz engine, whereas 85 to 90 per cent was formerly considered excellent efficiency. These lower efficiencies are not exceeded in some types of modern engines.

Marked improvement in boiler design, except from the safety standpoint, has not been made recently as the boiler was well developed years ago, but boiler settings and furnace designs have undergone radical changes within the last few years, resulting in a very great saving of fuel, as well as an increased capacity of boilers.

Good Output At Plants

Current Operations Satisfactory in Spite of Approaching Winter

By Our Eastern Correspondent

While future work in the construction field is noticeably on the decline, always to be expected with the coming of winter, current operations are going forward at a very satisfactory pace, with consequent activity in the sand, gravel and crushed stone industry. Sizable quantities of material are being absorbed and incoming shipments from the Long Island district and other producing centers indicate a fair rate of output at the plants. Leading producers are making the most of the favorable weather to create necessary reserves for the months ahead.

Road construction continues to be a point of interest in the rock products industry in the eastern section, and orders for material for immediate delivery are helping to swell current business. Early spring operations in this line loom big, as well, and record business is looked for as 1924 requirements come into the market. With regard to building construction, residential structures are well in the lead, and under the group building plan of handling a number of houses at one time, now so popular with speculative interests, there is a healthy tone to orders for basic materials, such as sand and cement.

The continued improvement in the labor situation seems likely to have a set-back with the forthcoming demand, just announced, of the local building trades; an aggregate of about 100,000 men in all lines will ask for a $1.00 a day wage advance commencing on January 1. This would increase the base rate from $10 to $11 a day. There is a proposal under discussion to offer the men an advance of 50 cents a day. Such a plan has been accepted by the marble cutters and setters, who have signed an agreement for a $10.50 work day. Stone setters' helpers are out on strike with a higher wage demand, as are also derrickmen and riggers. The latter are asking $10 a day, instead of $9, heretofore prevailing.

The prices of important materials are very firm; there is no present indication of early decline in levels, for depleted stocks in different lines is a matter of comment and concern. There is certainly no over-abundance of necessary commodities in the building construction field, and cement, sand, lime and related products take their respective places as among the materials in good call, but not in heavy burden reserve. Building supply dealers would show no hesitancy in stocking up if the materials were in the market.

First grade washed gravel has advanced at the New York market to $2.00 a cubic yard for wholesale carload shipments, both 1½ and ¾-in. sizes, as compared with a previous level of $1.75. This is the same as that applying last year at this same time. The supply yards hold to a retail figure of $3.50 a cubic yard, delivered on the job. There has been a decline of 20 cents a ton for gravel in the Boston, Mass., district during recent weeks, with present wholesale level standing at $1.40 a ton, both sizes. Local dealers are selling around $2.00 and $2.25 a ton.

Good quality building sand maintains at a $1.25 cubic yard level in the wholesale market at New York; there is a fair call for stocks at the present time, and dealers are turning the material at $2.50 a cubic yard, delivered. Fine white sand is priced retail at $5.00 a cubic yard, delivered. In the New England district, a wholesale rate of $1.10 a ton for best grade sand is prevailing, with dealers asking from $1.75 to $2.00 for material on the job in the Boston section.

Crushed stone in the New York market holds at $1.65 and $1.75 a cubic yard in wholesale quantity, f.o.b. city, 1½ and ¾-inch sizes, respectively. Current distribution is good for this time of year. Material supply yards continue at a rate of $3.25 a cubic yard, both sizes, for delivered stocks. At Boston, the figure has declined to $1.55 wholesale, as compared with a previous level of $1.60. Local dealers have not made any change in the retail quotation, and $2.50 is now a very well established level.

With regard to Portland cement, there has been a slight decline in price in the New York market, reflecting the recent change in mill base at the different producing centers. Dealers and contractors are now paying $2.15 a barrel in carload lots, less bags, alongside dock, while stock delivered at the yards is priced at $2.55 and $2.65 wholesale. The previous

alongside dock level was $2.30, and yard figures, $2.70 and $2.80. Consumers are being asked $3.10 a barrel for the material on the job, with allowance of 10 cents each for bags.

The Madawaska Company, Bangor, Me., has been formed under state laws to engage in a number of important lines of industry, including quarrying, mining and logging. The company is capitalized at $500,000 and is planning for the early operation of a local quarry. Fred A. Gilbert is president, and William Hilton, treasurer. Louis C. Stearns, Bangor, is clerk and representative.

The Manchester Marble Company, East Dorset, Vt., has tentative plans for the rebuilding of its local Friedley mill, partly destroyed by fire late in October with loss of about $100,000, including buildings, machinery and stock. It is planned to install new equipment in the reconstructed works. The plant has been operating on a 24-hour basis, giving employment to about 50 men.

The W. N. Flint Granite Company, Munson, Mass., has taken a contract for granite for the new addition to be constructed to the public library at Watertown, Mass., and will commence shipments at an early date. The plant is running at good capacity.

The Orleans Sand and Gravel Corporation, Buffalo, N. Y., has been chartered under state laws with a capital of $100,000, to operate sand and gravel properties in this vicinity. The company plans extensive activities. It is headed by R. C. Parsons, J. F. and E. W. Sutton, and is represented by W. H. Hickey, attorney, Buffalo.

The Penrhyn Slate Company, 255 East 138th Street, New York, has arranged for an increase in capital of 10,000 shares of stock, the proceeds to be used for general expansion.

The Tavern Sand Company, Millville, N. J., are commencing the construction of a new plant about 3 miles from the city for the production of silica and other sand. The plant will include an extensive washery, and is estimated to cost close to $100,000,

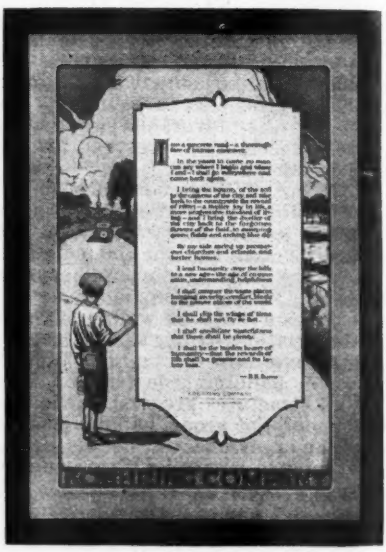
The Concrete Road

The Koehring Company of Milwaukee, Wisconsin, has had prepared in very artistic form an engrossment of B. K. Burns' "I Am a Concrete Road." The production is a notable tribute not only to the men who are building concrete roads, but also to those who are producing the materials used in building. The engrossment is suitably framed and makes a handsome appearance. The text is as follows:

I am a concrete road—a thoroughfare of human endeavor.

In the years to come no man can say where I begin and where I end—I shall go everywhere and come back again.

I bring the bounty of the soil to the canyons of the city, and take back to the countryside the reward of effort—a livelier joy in life, a more progressive standard



of living—and I bring the dweller of the city back to the forgotten flowers of the field, to sweeping green fields and arching blue sky.

By my side spring up prosperous churches and schools, and better homes.

I lead humanity over the hills to a new age—the age of co-operation, understanding, helpfulness.

I shall conquer the waste places, bringing security, comfort, ideals to the remote places of the world.

I shall clip the wings of time that he shall not fly so fast.

I shall annihilate wastefulness that there shall be plenty.

I shall be the burden bearer of humanity—that the rewards of life shall be greater and its labor less.

—B. K. Burns.

In The Cement Field

Continued Activity Is Reported and Many New Plants Are Being Built

The past month has shown little if any change in the situation in the cement district in the Lehigh Valley section of Pennsylvania, excepting the development of expansion plans by a number of companies, evidently impressed with the necessity for rounding out maximum production to supply the prevailing and anticipated demand. There is a fine tone to local affairs and all of the leading producers are making the most of conditions.

Practically every mill continues on the active list, including the plants at Northampton, Coplay and West Coplay, Bath, Easton and neighboring sections in Northern New Jersey. Production is just about able to cope with the call, although there has been greater opportunity in recent weeks to develop the necessary reserve for the winter months ahead. It is expected that full winter production will be the order of the day at a majority of the mills in this district.

Labor continues at a satisfactory status. Seemingly, there are sufficient men to fill all immediate demands, and employes, for the most part, are satisfied with the prevailing working conditions and wage schedules. All men who are willing to work can find ready and continuous employment.

Heavy shipments have been leaving these parts for eastern distribution, both by rail and motor trucks. The railroads are doing their best to comply with the call for cars. Just what real winter weather will show in this respect remains to be seen. At the same time, it is to be expected that there will be a slackening in the demand as the cold weather matures.

The fuel situation continues entirely satisfactory, and mills are well stocked, for the most part, for emergency conditions. This, however, is not looked for at the present time and it is expected that coal will be available in close to desired quantities throughout the months to come. The stability in the price levels in the different main distributing points is of material assistance in keeping local output on a systematic working basis and accurate knowledge of costs.

The Lawrence Portland Cement Company is maintaining active production at its Northampton plant and expects to continue so indefinitely. Necessary repairs to machinery are planned. The company has awarded contracts for the construction of six new tanks at this mill for storage service, and believes that the tank method of holding reserves is the best.

The Atlas Portland Cement Company is busy at its large Mills at Northampton, and heavy shipments are leaving for eastern and other destinations. The company is said to have orders on its books which insure present operations for some time to come, and excepting for the annual shut-down period, little curtailment is expected during the winter season. The company has filed a complaint with the State Public Service Commission against the Southern Railroad Company and other freight carriers, alleging that the rates charged from Navarro. Northampton County, to various points are higher than those prevailing for shipments of cement from Universal, in the same county. The company sets forth that the schedules are unreasonably preferential and prejudicial.

The Giant Portland Cement Company, Egypt, is advancing production at its local mills and has recently placed a new kiln in service, the largest in the Lehigh Valley cement district. It is expected to keep the new unit on the active list, together with other kilns at the works. Good business is being enjoyed and it is said that advance bookings indicate continuous production on a heavy basis for weeks to come.

Among the other active producers in this district are the Coplay Cement Manufacturing Company, at Coplay; the Lehigh Portland Cement Company at New Castle and West Coplay; the Alpha Portland Cement Company at Easton and Martins Creek; and the Penn-Allen Cement Company, Allentown. The Bath Portland Cement Company, Bath, and the Dexter Portland Cement Co., Nazareth, are also busy. All of these mills are giving employment to full working quotas, and thus far have not shown any indication of reduced operations.

At Vulcanite, N. J., the Vulcanite Portland Cement Company has work in progress on the installation of additional equipment at its plant. The machinery will be of latest approved type providing for both increased ca-

pacity and greater efficiency in operation. In connection with the latter, it is estimated that close to $100,000 a year will be saved over the former method of production. To provide for this expansion and for additional necessary working capital, the company has disposed of a bond issue of $600,000, covering a first-mortgage 20-year sinking fund. Operations are being maintained at maximum, and during the first nine months of the present year new production and distributing records have been established—the largest thus recorded by them. The present mill has a rated output of 1,900,000 barrels of material per annum. John B. Lober is president of the company.

The International Cement Corporation, 342 Madison Avenue, New York, is running under heavy output at the different mills of its subsidiary organizations, including the Knickerbocker Portland Cement Company, Hudson, N. Y.; Texas Portland Cement Company, Dallas, Tex,; Kansas Portland Cement Company, Kansas City, Mo.; the Cuban Portland Cement Company, Havana, Cuba, and other interests operating in South America. It is said that large orders have been booked for immediate and future deliveries, insuring continuous production on the present basis for weeks to come. For the third yearly quarter ending September 30, the company reports gross sales of $3,276,766, as compared with sales of $3,083,406 in the corresponding period of a year ago. The net income for this period after all deductions for expenses and reserves for depreciation, stands at $755,623.

The Petoskey Portland Cement Company, Petoskey, Mich., is running on a basis of about 2,500 barrels per day, and plans soon to increase this output with plant extensions and additional equipment to close to 4,500 barrels daily. Work is in progress on the expansion program, and foundations for the new kilns will be laid early in the coming year. The company will also construct a new power plant at the mill at the same time.

Recently organized California cement manufacturing companies are making ready for early construction of proposed new mills. Foremost among these is the Guadalupe Portland Cement company, formed by San Francisco interests with a capital of $3,000,000, a number of months ago. Property consisting of about 260 acres of land has been purchased at San Jose, Cal., in the Almaden mines district, which will be used as a site for the new mill. The plant will consist of several operating units, with power house, machine shop and other mechanical buildings, and is estimated to cost close to $1,000,000, with machinery. The new company is headed by Frederick G. Cartwright and Robert Dunlay, and is represented by Boswell F. King, Humboldt Bank Building, San Francisco.

The San Joaquin Portland Cement Company, organized by interests connected with the Old Mission Portland Cement Company, 608 Crocker Building, San Francisco, is arranging tentative plans for the erection of a new plant in the vicinity of Three Rivers, Cal., where a site of considerable acreage has been selected. This mill will comprise a number of buildings, with power plant for service and other miscellaneous structures, and will cost more than $600,000, with machinery. It will be equipped for an initial capacity of about 3,500 barrels of high grade Portland cement per day. The new company is headed by Herbert Coffman and F. A. Parker, both officials of the Old Mission company.

The Yosemite Portland Cement Company, Merced, Cal., has commenced the erection of its proposed new mill in the Jenkins Hill section, for which a site recently was purchased. The works will consist of two main units, 65x160 feet and 35x145 feet, with a number of smaller buildings, and will cost close to $500,000. Additional buildings will be erected later, it is stated, to bring this cost to about double such amount. A large bunker storage, with capacity for 1,000 tons at a time, will also be built. M. Steinmetz is chief engineer.

It is announced that the Wisconsin Lime & Cement Company has purchased a tract of land between Cary and Crystal Lake on the Chicago & Northwestern Line, comprising a fraction of 257 acres and that work is now under way for the development of one of the most modern torpedo sand and gravel plants in the country. Switchtracks are already in from the main line to the property and a large drag line is in course of erection.

The company plans to have a plant capacity of 60 cars, or better, per day and will be ready to start operations early in the spring.

State Highway Bids

Indiana Receives Bids on 1,500,000 Barrels of Cement. The "Cement Trust" Case

Bids were received by the Indiana State Highway Department for approximately 1,500,000 barrels of cement, estimated to cost more than $3,500,000 in its 1924 program for the construction of approximately $1.65 to $1.82 a barrel at the mills, in comparison with $1.60 to $1.75 paid for cement used this year.

In the present bidding, cement is to be delivered at approximately fifty places in the state. The Louisville Cement Company bid for delivery to Indianapolis, $2.13 a barrel, net. The net price includes the mill price plus the freight, with a deduction of 40 cents a barrel for the return of cloth sacks and 10 cents a barrel for cash. The Universal Portland Cement Company, the Lehigh Cement Company and the Indiana Cement bid $2.11 a barrel, and the Atlas Cement Company bid $2.30 a barrel, all net prices. The Sandusky Cement Company bid $1.80 a barrel, mill base. For delivery at Dyer, Lake County, the Universal, whose plant is in that county, bid $1.84 to $1.94 a barrel, net, the Lehigh Company bid $2.21, and the Atlas Company, $2.34. For delivery at Jeffersonville, the Universal Company bid $2.18 and the Atlas Company, $2.42, both prices net.

The lowest bidder was the Universal Company, with an estimated bid of $1.65 at the mill, and the highest was the Wabash Cement Company, of Stroh.

The Indiana state highway commission and attachés of the department are watching with great interest the steps being taken in the suit of the government in the federal court at New York city to dissolve the alleged cement trust, because, they announced, they are planning to buy between $2,500,000 and $3,000,000 worth of cement for an extended highway building program next year, if the prices seem right. It is likely that bids on the cement will be sought before the first of the year.

Late in 1921 the Indiana state highway commission solicited and received bids from cement manufacturers for the highway department's needs. The bids for the business were, with minor exceptions, identical and otherwise were surrounded with conditions that caused Governor McCray, members of the commission, and U. S. Lesh, attorney-general, to come to the conclusion, it was said at the time, that Indiana had to deal with a cement trust.

For several months the state tried by various means to deal with the situation. There were conferences of the state officials with officials or representatives of cement manufacturers; there was talk of having various state highway departments boycott the cement manufacturers; there were negotiations with federal officials and other doings in an effort to find some way to get around the so-called trust.

The result was that late in 1922 Governor McCray, Lesh and members of the highway commission publicly said at different times that the so-called cement trust was nation-wide and that a single state could not cope with it, and that Indiana practically would have to submit to the prevailing conditions. Lesh said it was useless for the state to try to carry on an independent fight against the alleged trust and he announced that he would collect all data available on the subject and lay it before the federal government officials who were conducting an investigation of national scope.

From time to time the state legal department did this, Lesh said, and contributed what information it could to assist the federal government in reaching the point where the case now stands.

Surprise that stock in the Newton County (Ind.) Stone Company was included in the list of Governor McCray's assets filed in the federal court was expressed not only in the state highway department, which buys much stone from the company, but by the governor himself. The list was filed in connection with the action to have the governor declared a bankrupt.

When a question arose about the propriety, if not the positive illegality, of the governor selling stone as a private citizen to a state department directly under his authority, it was said by L. H. Wright, then director of the department, that the governor had stated on April 25, 1921, that he had disposed of his interest in the company some time before in 1920. This was the understanding also of John D. Williams, present director.

The Koch Sand and Gravel Company, with a capital of $100,000, and Henry Koch of the George L. Mesker Company, as the principal stockholder, has been organized at Evansville, Ind. According to Koch, the company will occupy the property of the Evansville Sand and Gravel Company and the MacArthur Hanger Company, and will build a fleet of eight barges, a digger, derrick boat and a steamboat. About sixty men will be employed. Mt. Vernon and Evansville will be the scenes of the company's operations.

The Indiana Quarry Company has purchased 600 acres of fine stone land near Stinesville, Ind., for a sum of $75,000, according to word from Bloomington, Ind. The land was owned by the Illinois Steel Company and is said to be fine stone land.

William E. Baney, Greencastle, Ind., and a well-known stone man who had been critically ill for the past several months, died recently. Heart trouble was the cause of his death. Mr. Baney was born and reared in Ohio, and with his family went to Greencastle about twenty years ago. During that time he was associated with the A. & C. Stone Company, now the Midwest Quarries Company, and for many years was superintendent of the Greencastle mill of that company. He was 64 years of age, and besides his widow, is survived by an only son, J. Irwin Baney, of Kentland.

The Victor Stone Company, Bloomington, Ind., has increased its capital from $100,000 to $250,000.

Andrew Ziegler, Bloomington, Ind., is to be vice-president of the new Indianapolis Oolitic Stone Company, which will operate quarries near Stinesville and other parts of the oolitic district. The company has been incorporated for a half million dollars. A new mill is also part of the Stinesville project. John W. Easton, of Stinesville, is president of the company, and Harry M. Libbs, Indianapolis, secretary-treasurer. The directors are: John W. Easton, Ellettsville; Brint Easton, Ellettsville, superintendent; E. F. Weber, Clay City; O. W. Summerville, Burns City; C. H. Webb and C. E. Webb, Indianapolis.

In the Federal Court in Indianapolis recently in a suit brought by Jesse A. Shearer, of Indianapolis, against Charles F. Christner of Goshen, Ind., for infringement on patent rights involving gravel dredging apparatus, Judge Anderson held the Shearer patent valid and infringed, and Christner was permanently enjoined from further use or manufacture of the device. The courtroom had the appearance of a machine shop, or a toy shop, from the number of models and drawings that were offered in evidence. The case was vigorously contested. The evidence showed the device complained of in the suit was furnished to Christner by the Page Engineering Company of Chicago, through the Godfrey Conveyor Company of Elkhart, Ind. The patent in suit had previously been broadly sustained by a number of courts in various parts of the country, and has been held to cover broadly any device of the kind in which the dumping of the bucket is accomplished by the same pull that is used to fill the bucket.

Bids Postponed

Bids for approximately 4,000,000 barrels of cement were received by the Department of Public Works and Buildings of Illinois on December 10 for the 1924 road construction program. These were considerably in excess of last year's prices. The prices quoted by the different companies f. o. b. the various county seats in the State show a marked uniformity.

There being nothing to warrant this increased price, the bids received at both of these lettings have been rejected, and in view of the existing situation, the receiving of bids for road work has been postponed indefinitely.

The $20,000 plant of the Outagamie County Limestone Company, begun last June a mile north of Black Creek, Wis., has recently been completed. The crusher, capable of crushing one hundred twenty-five tons of stone a day, has started working. Bins in the new building hold about seventy carloads of crushed stone. The new plant is a little southeast of the old building, which has been torn down.

Due to the greatly increased demand for cement, the Olympic Portland Cement Company, Seattle, operated their plant until Christmas, planning to resume operation early in 1924. Cement mills in central Washington will close only for small necessary repairs during the holiday period this year as demand warrants operation on a three-shift basis, including Sundays and holidays.

A Prosperous Year

Unusually Big Production Recorded by Leading Material Companies

By Our Pittsburgh Correspondent

The leading sand and gravel producers in the Pittsburgh, Pa., district continue to maintain active operations, with some companies running entire fleets under maximum output. The sand-diggers are making the most of the present favorable weather, and heavy distribution has been prevailing in the local and neighboring markets during the past month. The close approach of winter apparently is having no effect on future business and a number of early advance orders for material have been recorded.

Repair yards, also, are equally busy with work on steamers and barges, slated to be pressed into service at the earliest date. There are an appreciable number of new steel barges now in course of building, or about to be launched, and consequent additions to different fleets are expected in the near future. The Drave Contracting Company is one of the active interests in this line, and is carrying out work at its shipways on a number of important orders.

Market quotations hold to established levels and there is marked stability to the figures. Producers, no matter how keen for business, are not inclined to go below the recognized prices. Washed gravel is being sold f.o.b. barge, alongside dock at $1.60 per cubic yard, while waterfront delivery holds to a $2.00 basis. The supply yards are asking from $2.00 to $2.75 for stocks delivered by motor trucks on the job.

Good quality washed sand is being turned on wholesale account at $1.40 and fractional variations per ton, on the waterfront. There is a firm call for the material both in quantity shipments and retail allotments. The latter is holding to a price of $2.40 and $2.50, on the job.

Crushed stone is priced at $2.85 per cubic yard in the wholesale market for 1½ and ¾-in. sizes, while supply yards quote from $3.50 upwards for delivered stocks. There has been a little easing in call for material in recent weeks, due primarily to the seasonal change. Portland cement is selling at $2.24 a barrel without bags in the Pittsburgh wholesale district, while on retail account, dealers are asking $3.50, with customary bag rebate.

The Keystone Sand & Supply Company is continuing under heavy production and current distribution has reached a high point. This year's output stands as the best in the history of the company, according to a recent statement of A. W. Dann, vice-president and treasurer of the company. The company is having plans drawn for the construction of a new steam-operated sand and gravel digger, and it is expected to place work in progress at an early date. Repairs have been made to the fleet, which is now in fine condition.

The Rodgers Sand Company is one of the most active producers in the Pittsburgh district at the present time. It has its entire fleet dredging at Fourteen-Mile on the Allegheny River. As in the case of the above concern, the Rodgers company has produced a heavy tonnage of sand and gravel during the past year, reaching close to record-breaking attainments. Incoming orders are of appreciable size, speaking well for the future.

The McCrady Brothers Sand & Gravel Company, Braddock, near Pittsburgh, Pa., has work under way on the rebuilding of the sand and gravel hoist at its dock on the Monongahela River. Other improvements may be made at an early date, in line with extensive operations now planned

at the plant. The company has been enjoying good business.

J. K. Davison & Brothers are operating their electric dredge, "Allegheny," in the vicinity of Twelve-Mile Island, under the direction of Captain Charles A. Smith. The sand-digger is one of the most efficient on the river and is turning out a large quantity of material daily. Active work is under way on repairs to a number of barges and flats at the company boat works at Aspinwall, looking to their early return to service. John S. Nicholson, engaged with the company for about 14 years past, and for some time purchasing agent, has been compelled to resign on account of ill health.

The McMyler Convertible Crane

Combining a steam shovel and crane in one machine is the basic idea illustrated in a new folder, Bulletin 55, just gotten out by the McMyler-Interstate Company.

The McMyler-Interstate No. 2 is illustrated as a machine operated by steam, gasoline or electricity, and mounted on crawler, wide face traction wheels or a 4-wheel railroad car body. It can be operated as a crane with a clam shell bucket, or with a drag-line bucket, as a pile-driver or as a lifting magnet. Bulletin 55 shows shows how to assemble this 10-ton convertible machine. Correspondence is invited.

Donald B. MacNeal, contractor and dealer in industrial equipment, has taken over the United States Equipment Company shops at McCook, Ill. Mr. MacNeal was formerly with McArthur Bros., and for five years was general manager of A. C. Torbert. His Chicago address is Suite 1101, 166-172 W. Jackson blvd.

The Atlas Rock Company, Oakdale, Cal., is installing a huge rock crusher on the plant taken over from the Modesto and Turlock Irrigation districts, just west of Oakdale. The company is constantly increasing its equipment as well as output of both sand and gravel.

New Rex Chain Office

Chain Belt Company, Milwaukee, Wis., manufacturers of Rex chain, transmission machinery and conveying equipment, formerly represented on the Pacific Coast by Meese & Gottfried Company, San Francisco, has established direct factory branches and warehouses in Portland and Seattle. Arrangements have also been made with the Washington machinery depot, Tacoma, Wash., to carry a large stock of Rex chain and transmission machinery. Other stocks will be placed in important centers throughout the Pacific Northwest for the prompt handling of local requirements.

The Northwest territory, with headquarters at Portland, will be in charge of Allen C. Sullivan, M. E., a graduate of the University of Washington. Mr. Sullivan was formerly connected with the Allis-Chalmers Co. of Milwaukee and more recently with Smith & Watson Iron Works of Portland as chief engineer. Just previous to his association with the Chain Belt Company he was engaged in special sawmill work as consulting engineer.

Don B. Catton, formerly with Meese & Gottfried Co. and later engaged in the machinery supply business on his own account, will be the special sales representative for the Portland office. The Seattle and British Columbia territory will be handled by Wm. F. Nichols out of the Seattle office. Mr. Nichols for the past 11 years has been connected with the Meese & Gottfried Company and is considered one of the best posted chain men in the Pacific Northwest.

The Portland office of the Chain Belt Company is located at 67-69 First St., Portland, Ore., and the Seattle office at 1040 Sixth Ave. So., Seattle, Wash. Large stocks are maintained at both places.

Domestic interests opposed a reduction in tariff on magnesite at the hearing by commission on Application of Importers. George W. Selby, representing the Magnesite Cement Prod-

An estimated loss of more than $20,000 was caused by fire at the Trinity Portland Cement Company plant, Dallas, Texas. The sacking building was completely destroyed by the flames and a large quantity of finished cement was badly damaged by water.

Big Year in Kentucky

All the Big Sand, Gravel and Quarry People Busy Throughout the Year

By Our Louisville Correspondent

As the year comes to a close and the quarry, sand and gravel people begin to tally up the records it becomes evident that 1923 has been an unusually good year for them as well as for railroads and highway construction.

The volume of demand for sand and gravel has been so good that it has taken some hustling to serve the current demand and put by reserve stocks for the winter.

R. B. Tyler, who has been active both in quarry work and in road building and surfacing, says it has been a busy year with them all the way through. They have not operated their big quarry near Louisville, but have installed a number of small quarry plants during the year in connection with road contracts. Next year their big plant near Louisville will be put into operation.

The indications now are that the river operations of the E. T. Slider Company, and the Ohio River Sand Company, and of the Nugent Sand Company, may continue later than usual and thus enable them to get in a goodly reserve stock for the winter months.

Word comes up from Paducah that F. W. Katterjohn has disposed of all of his quarry interest to F. E. Lack, of Paducah, who will continue to carry on with the quarrying.

The R. B. Tyler Company, of Louisville, have had a busy season of it and are still busy mainly on road contracts and with quarries connected thereto. They report that more help is available now and they expect to keep plugging away as long as the weather will permit.

The Sparks Quarries have been operating right along and the Katerjohn Quarries, which changed hands recently, have also kept operating steadily through the year.

Among the sand and gravel people it is the same story, only more so. The report for the year will show on the whole about 25 per cent greater than any previous year. With most of the active concerns they had attained last year's record by the end of nine months, and by the end of the year probably about 25 per cent above any previous year.

The bigger factors in the sand and gravel business here are the E. T. Slider Company, with plants both in Louisville and at New Albany, Ind. Also a branch plant down the river at Rockport. The Ohio River Sand Company, with a big plant and yard on the bank of the Ohio River, and the Nugent Sand Company, another riverside concern up in the same community. The weather has been mild and building operations have continued up to the middle of December.

There are enough road contracts already let to insure busy times through the main part of the new year for both the quarry folks and the sand and gravel people.

Douglas Fir Barges

The necessary attributes of ship and barge material—in carrying sand and gravel as well as any other material—are strength, resiliency, buoyancy, durability. The H. J. Miller Lumber Company of Seattle are manufacturers of barges, ship decking, timbers, masts and spars, made from "Foothill" Douglas Fir, in which these prime qualities are found.

This timber, which is cut from the Foothills or Table Lands, is noted for its resiliency and toughness. It is claimed to possess practically the buoyancy of white pine, and much of the strength and durability of oak, while weighing less than 3,300 pounds to the 1,000 feet board measure.

Shippers of sand, gravel and related products interested in purchasing barges and lumber materials are invited to correspond.

N. J. Martin of San Francisco has taken out a building permit for the erection of a plant at 355 Bickett street, Huntington Park (Los Angeles) Cal., to be known as the Gypsum Tile Factory. The building has been started and will be finished within a short time, after which machinery will be installed for the manufacture of wall partitions. It is expected that when the plant is in full operation, one carload of gypsum will be used every twenty-four hours.

Associated with Mr. Martin in the enterprise is A. J. Bruce of Los Angeles.

Westinghouse Developments

A long list of engineering achievements for 1923 are recorded by the Westinghouse Electric & Manufacturing Company in a bulletin prepared by H. W. Cope, Assistant Director of Engineering for that company. Some of these follow:

Turbine-generators: Many large units were placed in service in 1922.

Frequency Changers: "The world's largest frequency changer" was recently installed, with a rating of 35,000 k.w. generator output, at 100% power factor. Also other orders of interest.

Synchronous Condensers: Synchronous condensers for voltage control at the receiving end of long high voltage transmission lines and power factor correction, are in demand, as evidenced by many installations.

Synchronous Converters: An improvement in design of large 60-cycle booster synchronous converters used in lighting service.

Synchronous Motors: New type of damper winding for high speed synchronous motors, condensers and generators, simplifying construction and increasing capacity for withstanding higher overspeeds.

Motor Generator Sets: A large number of motor generator sets of various types.

Transformers: The great growth of power systems is necessitating the raising of transmission voltages to an unprecedented degree.

Switching: Meeting the increasing duty requirements on switching apparatus, to meet short circuit requirements up to 1,500,000 kva. has been developed.

Transmission: Larger blocks of power transmitted.

Feeder Regulators: The largest step type induction regulator ever constructed.

Static Condensers for Power Factor Correction: An improvement in design and construction giving them a reliability of 100 per cent.

Steam Turbines and Condensers: Large turbines: A number of novel features developed. Condensers: An improved line of unit type condenser of up to 4,000 sq. ft., giving greater efficiency and accessibility. Small Turbines: A 1½ kw. generator set for industrial purposes.

Railways: Light Traction: Continued improvement in design of motors and control apparatus. Line Material: The Universal frog with bayonet approach, giving increased life and ease of installation.

Ducks and Steam Shovels

If the Pawling and Harnischfeger Company may be believed, the government is not the only manufacturer of amphibious machines. The following story indicates that the P. & H. ¾-yd. Gasoline Shovel is as much at home in the water as on dry land.

Recently the Dells Paper & Pulp Company of Eau Claire, Wis., used a P. & H. ¾-yd. shovel on their new dam construction job. Unfortunately, this dam was surrounded on both river banks by high bluffs and it was decided that the only way to get the machine to location was by dismantling it, lowering the parts by derricks, and reassembling them down below.

The manufacturer, hearing of this predicament, sent engineers to investigate. These men reported that the machine could be run into the river a quarter of a mile below the dam and moved upstream under its own power. This seemed very dangerous to the owners, as the river bottom was full of deep holes and ledges. However, the attempt was made.

Many times it looked very bad to the watchers on the bluff. The machine, running over ledges, would rear like a duck taking a dive. At other times it ran into holes, and the water would almost reach the magnets and carburetor. After hours of negotiating through the swift black water, during which the machine behaved perfectly, the cofferdam was reached. Another hour while the planking and supports were re-enforced, and the machine came out of the water like a huge hippopotamus, crawled over the dam and down into the hole 12 feet below. It took just 5½ hours for three men to do the trick.

Reassured by this experience, the owners are now running their P. & H. around the river like a rubber duck.

Cajon Rock and Gravel Company, Los Angeles. Capital, $250,000; shares, 2,500; subscribed, $300.

New Milwaukee Type "H" Gasoline Locomotive

The new Milwaukee Type "H" Locomotive will be on exhibition at the Good Road Show in Chicago, January 14 to 18, in spaces W-12 and W-13.

This new model is built in one standard design, in sizes of 3½ to 15 tons, is furnished for all gauges of track and equipped either with or without electric starting and lighting.

The locomotive will be equipped with couplers of the link and pin or standard M. C. B. type as may be specified.

The journal bearings are of the well known Hyatt Roller Heavy Duty type.

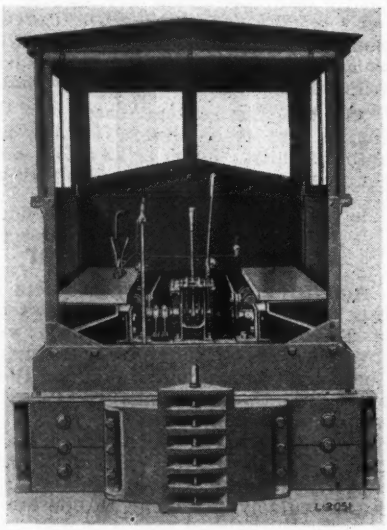
The hood is made of sheet steel and has four removable hinged steel side covers. The hood is so designed that it may be readily dismantled by merely removing a few bolts and cap screws.

The engine of types "H3" and "H4" (3½ and 4-ton) machines is of the well-known Hercules model "O," 4-cylinder, heavy duty type, having a 4-inch bore and 5-inch stroke, and capable of developing 40 hp. at 1,400 r. p. m.

The engine of types "H6" and "H7" (6 and 7-ton) machines is of the Beaver model "JE," heavy duty, four-cylinder type, which has overhead valves and removable head. It has a 4¾-inch bore by 6-inch stroke and at 1,000 r. p. m. will readily develop 50 hp.

The engine of types "H9" and "H10" (9 and 10-ton) machines, is of the Beaver six-cylinder, heavy duty type, model "JD," 4¾-inch bore by 6-inch stroke, and has overhead valves and removable head.

NOTE—All engines used in type "H" Locomotive have force feed lubrication and force water circulation, and

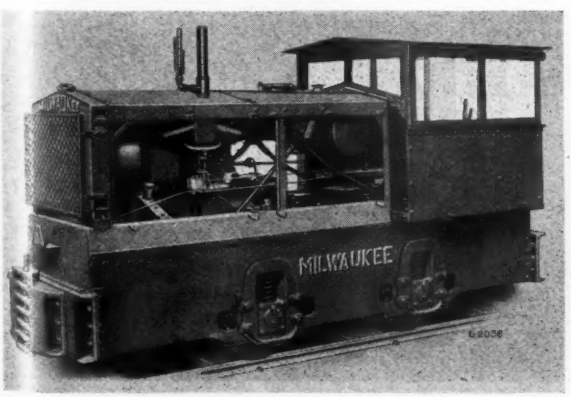


End View of Milwaukee Locomotive Showing Interior of Cab

are equipped with Eismann high tension magneto, Wheeler Schebler carburetor, automatic air cleaner and maximum speed regulating governor.

The transmission, which is of the latest design, is of the jaw clutch and gear type. In this type of transmission the gears are always in mesh, the speed changes and direction of travel being effected by means of jaw clutches. It is designed especially for heavy duty service in which the possibility of stripping the gears has been entirely eliminated. It is geared for four speeds, both forward and reverse. Standard truck type of gear shift control is employed.

The design of the brake is a radical departure from the regular 4-wheel brake, the brake being of the drum type, with the



New Milwaukee Type "H" Gasoline Locomotive

drum mounted on the drive shaft of the transmission. This type of rake has been found to be equally as effective as the 4-wheel brake and has the advantage of being far more simple in design and consisting of practically only one-fourth the number of parts usually contained in the conventional wheel brakes. It is operated by a hand lever and also requires less attention, having but one adjustment.

All bearings except those of the engine and transmission (which are automatically lubricated) are equipped with Alemite grease fittings.

The Insley Excavator

Admitting that the general field of excavating equipment of a capacity of ¾ yards or greater has been well covered, the Insley Manufacturing Company, Indianapolis, Ind., in literature recently issued, makes representations to the effect that no excavator for handling earth and kindred materials having a less than ¾-yard capacity has yet been produced. This is particularly pertinent to operators, in view of the fact that the first cost of the heavier excavating units has been prohibitive for the lighter work to be done.

To meet this demand, the Insley Excavator has been developed. This is a one-man operated machine of sturdy design, strong construction and speedy operation. The first cost of the machine is comparatively low, and the operating and maintenance cost are claimed to be under those of other available units for like work.

This machine is a combination of excavator and a Fordson Tractor equipped with a crawler. By substituting necessary parts, it can be used either as a shovel with a 1/3-yard bucket, a ditcher with a ½-yard scoop, or a crane. As the latter, it can be used for handling a ¼-yard clamshell or for general hoisting purposes where loads do not exceed 2,500 pounds at a 16-foot radius, or 1,300 pounds at the full 25-foot radius.

It is believed this machine will handle materials at a saving where heretofore hand labor has been employed.

Told in Pictures

In a 34-page book The Morgan Engineering Company of Alliance, Ohio, has issued a beautiful "pictorial review of a complete engineering plant and its departments."

The Morgan Engineering Company, established in 1868 by the late Thomas R. Morgan, Sr., inventor and engineer, "was the first, and is today the leading manufacturer of electric traveling cranes of all types and sizes." The company also manufactures heavy forging equipment, rolling mills and other heavy machinery. There are many illustrations of the plant inside and out, showing the many machine rooms and the various stages of manufacture.

The New Insley Light Duty Excavator

New Model "Plymouth" Locomotive

The new Model FL 4-ton, 4-speed Gear Drive Gasoline Locomotive just announced by The Fate-Root-Heath Company, Plymouth, Ohio, unusually rugged and substantial in design and construction, is built on the same general design as the well-known Model DL 7-ton Gear Drive Plymouth.

This new model easily develops a draw bar pull of 3,000 pounds in first speed on sanded rail and a correspondingly high draw bar pull on higher speeds. The speeds provided are 2⅔, 4, 8 and 12 m. p. h., either forward or reverse.

The design of the transmission used has been thoroughly demonstrated in the heaviest kind of work possible as being thoroughly reliable.

As in the Model DL, the long main drive chain is eliminated by substitution of an additional gear in the transmission, thus greatly strengthening the locomotive at this point and reducing the possibility of interruption of service.

The gears throughout the transmission are of very wide face and comparatively large diameter, affording minimum wear and maximum life. The sliding gears are made in pairs on the second driving shaft, affording extra long hub length. Only those gears that are actually transmitting power are in mesh, which greatly reduces wear. Forward and reverse speeds are obtained by large bevel gears with internal gear teeth into which the pinion that drives the final gear meshes, thus doing away with jaw clutches.

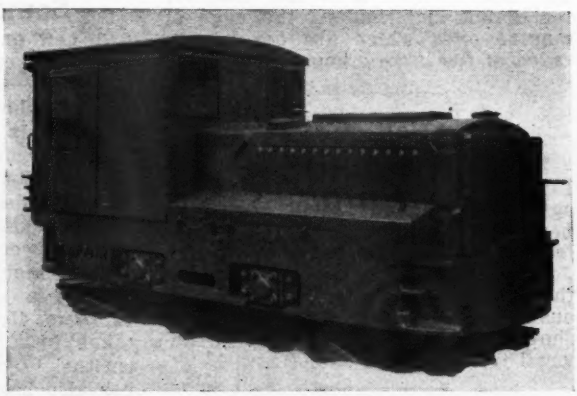
All gears are of special steel forgings, machine cut, and hardened and supported by large ball bearings.

The clutch is of the twin disc design, modified to suit the particular installation in this model and embodies combined clutch-retarding and auxiliary brake.

The power plant consists of a Waukesha Model Y 4-cylinder verdertical engine with cylinders having 4-inch bore and 5¼-inch stroke, equipped with removable cylinder sleeves and having full force feed oiling system.

Accessories used are Bosch high-tension magneto and the well-known Stromberg carburetor with Modine sectional core type radiator, which is provided with a heavy steel guard.

The axles are mounted on Hyatt high duty roller bearings with hardened steel sleeves to take the wear, and the end thrust is taken by bronze thrust plates located in the axle boxing caps which afford perfect lubrication. Axle springs are well proportioned, resulting in easy riding and allowing the wheels to readily follow uneven track.



New Model FL 4-ton Plymouth Locomotive

Bay City's Eastern Offices

The Bay City Dredge Works of Bay City, Michigan, has established an eastern sales office at 302 Broadway, New York City, in charge of Mr. E. P. Reading, as eastern sales manager; also a branch office at Boston, Mass., 51 Ames Building, in charge of Mr. Thomas D. Connolly.

Gulf Coast Gravel Company, with headquarters at Pensacola, will be incorporated for $10,000 to deal in sand, gravel, lime, brick and builders' supplies and equipment. Charles E. Parker will be president and treasurer; R. D. Orders, vice-president, and John P. Henderson, secretary. The company is composed of Kentucky men connected with the firm of Speed-Parker, Inc.

McMyler Quick Unloading

The Birmingham Sand and Gravel Company, Detroit, Mich., is confronted with the problem of unloading its cargoes of sand and gravel in minimum time, and in moving this material from the dock into the adjacent storage yard so that the dock may be cleared to care for the cargoes of other vessels.

A large electrically operated traveling crane, developed and erected by the McMyler-Interstate Company, Cleveland, was installed to handle materials at this plant, and this equipment performs the task with an unusual degree of rapidity.

This crane has a working radius of 90 feet and handles a clam shell bucket having a capacity of 4 cubic yards. Under normal conditions, the crane makes at least two trips a minute swinging to an angle of 105 degrees and return. The hoisting speed maximum load, is 200 feet per minute.

This large crane is designed to travel on a track of 20-foot gauge either straight or with curves, with 90-foot minimum radius. The wheel base is 21 feet. The arrangement of the operating mechanism is such that any or all functions of the crane may be performed either singly or simultaneously.

The same illustration shows a McMyler-Interstate No. 2 steam operated convertible crawler crane, equipped with a 40-foot boom and a two-line ¾ cubic yard clam shell bucket. This crane is used for rehandling materials, as well as for loading into hoppers and trucks. It is also used for reclaiming materials at the edge of storage piles which are beyond the reach of the large crane.

Link-Belt Calendar

True to established custom, the Link-Belt Company of Chicago has again issued an art calendar for the new year. The illustrations shown are from the justly famous Chicago artist, Jeffrey Grant, accurately portraying the construction features of the various types of Link-Belt equipment shown, but with an artistic touch unusual to mechanical subjects.

Ashland Limestone Co., Carter, Ky. Capital, $200,000.

Amsco Plant in West

The American Manganese Steel Company announces that it has purchased the foundry formerly operated by the Queen City Foundry Company of Denver, Colo., and that plans are being made to increase the capacity and modernize all equipment so that not only can the usual line of work be continued but in addition manganese steel under the Amsco patents and processes can be produced.

The personnel of the Denver management will comprise men of many years' experience with the manifold problems of production, field service and business routine, which will combine to give the utmost in service. Mr. J. M. Blake, metallurgist, has been appointed general manager, and will be ably assisted by Mr. Kenneth Jensen as manager of sales. Mr. Jensen has represented the company for several years as traveling sales engineer. Mr. Blake will be remembered by many customers in the inter-mountain states by reason of the numerous experiments and tests successfully conducted by him with various alloy steels.

In addition, the company will be represented in Utah and eastern Nevada by Landes and Company of Salt Lake City; in New Mexico and Arizona by Mr. Herbert B. Wolcott, Jr., of El Paso, Texas, and by the A. T. Herr Supply Company of Denver in the state of Colorado.

Some Reel Blasting

A new one-reel motion picture has just been completed by the du Pont Company, entitled "Dynamite at Work," which shows the use of that explosive in various parts of the country and under various conditions. Views of some of the largest dynamite shots made during the past year, where thousands of pounds of the explosives were used, are featured.

One highly interesting view is that of a slow motion picture shot of some 45,000 pounds of dynamite, taken in a quarry. Another picture entitled "Dynamite in Quarry Work," has also been prepared. This is also a one-reel picture. Both pictures are available on request to the Company.